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Second preface to Vol. XXX

Iconographic honesty

(Followed by a Bibliography of iconographic studies and a Note on altered portraits)

There are between men infinite differences in kind and even more so in degree. For it could be claimed that we all have very much the same qualities, though these qualities vary exceedingly in extension and intensity. For example, it is possible that even the meanest of men have some sparks of generosity; it is possible that all men are generous, though when we try to analyze that single quality we realize the existence of endless diversities. The one man is generous with his time, while the other is very greedy of it but generous with his money, and others still are generous only with their advice. As our analysis goes deeper we realize the increasing complexity of the differences. Some men are always ready to spend lavishly for their friends' sake but only in the form of dinners or other entertainments. The specialization of that quality goes even further. I was told the story of a rich man who loved to order extravagant dinners and spared no expenditures for such friendly occasions, but when it came to cigars (he was not a smoker) he was as avaricious as could be, and thus he more than once spoiled a princely repast with atrocious stogies.

Similar remarks will occur to the reader's mind with regard to other qualities, each of which is capable of infinite variations. Thus truthfulness; it is not enough to say that men are more or less truthful, and to try to measure the intensity of their truthfulness; one must try to determine the field of it. Some men may be depended upon to tell the truth in matters of business, but not in war or love or fishing... Some report truthfully their scientific investigations, but their intellectual probity loses its keenness or vanishes altogether under the influence of passions, such as political hatred or professional jealousies. Scientific truthfulness

is capable of further differentiations. I have repeatedly insisted on the distressing fact that the very man who will make and report physical measurements with pedantic accuracy, is capable of picking historical data and recording them in the most careless manner without any attempt at verification or precision.

The most remarkable differentiation is the one which I propose to discuss to-day, the restriction of historical scholarship and honesty to texts, that is, to words versus pictures. Some historians will take considerable pains to insure the accuracy of each and every statement and then select relevant or irrelevant illustrations with the utmost laxity.

The explanation of such an aberration is natural enough. There is an established tradition for historical records expressed by means of words; that tradition is carefully taught in seminaries, and young historians, eager to earn their spurs, are deeply imbued with it. A similar tradition has not yet been developed with regard to iconographical documents, or it has not been explained as frequently and as deeply. The problem of how to illustrate a text is often completely neglected in historical seminaries. Indeed in earlier days the illustration of books offered too many technical difficulties and was likely to increase the cost of publication overmuch; hence the majority of historical memoirs lacked illustrations, or had only a few; and there was no temptation to investigate iconographical problems. On the other hand when historical books were illustrated, the illustrations were often selected by men other than the authors, and their connection with the text was not always so clear and strong as one might have wished.

In our days, it has become possible to reproduce images so cheaply by means of microfilms and photostats, and to print them sufficiently well at a low cost, that there is no excuse for omitting iconographic evidence whenever it is available. To be sure some processes of reproduction are expensive and will presumably ever be so, but for plain scientific purposes (as opposed to artistic ones) they are but seldom needed. For example, a portrait should be reproduced clearly, but it is not necessary for the scientific argument that every nuance of the painting be recorded. In the case of a portrait which is truly beautiful I would like to reproduce it in *Isis* as perfectly as possible, but that craving for perfection

is in this case a luxury which I am obliged to resist unless the author or another friend is willing to help me.

To return to the illustrations which are sufficient for scientific purposes, it is possible now to provide as many as may be necessary for the completion of the argument, and it is the historian's duty to provide them. This increases considerably his opportunities of giving richer and better information, but it increases his responsibilities in proportion. For example, compare the most fastidious description of a title page with a facsimile of it. Not only does the latter give information which could hardly be conveyed by means of a multitude of words, but it gives it immediately.

This is the heart of the matter. Information given by means of printed words is necessarily slow and gradual; one must wait for the words to succeed each other one by one, and we cannot be sure of any thing until the last word has been read. On the contrary, every picture says all it has to say at once. The wordy message is analytic, the pictorial one, synthetic. The text is an evolution of ideas; the image, an involution.

The preceding remarks apply with especial force to portraits. Compare a written portrait with a painted one, or even with a photographed one! What an abyss between the two! Let us take them both at their best, and consider on the one hand an excellent biography and on the other a masterly painting. The best biography cannot be appreciated without being read slowly, annotated and analyzed. If we wish to assimilate its substance we must be prepared to make a great effort of concentration, or rather a whole series of rhythmical efforts, in turn analytical and synthetic. Now look at the painting, let us say, FRANZ HALS' portrait of DESCARTES in the Louvre, and lo! there you have the whole man at once, —that intelligent yet crossgrained and cantankerous man, almost alive. You are given immediately some fundamental knowledge of him, which even the longest descriptions and discussions would fail to evoke.

The same thing cannot be said of many portraits. Even as the written biographies may vary along the whole gamut from ultra-goodness to infra-mediocrity, even so paintings and photographs differ exceedingly. Some are extraordinarily revealing as HALS' portrait of DESCARTES or the photographs of PIERRE and

MARIE CURIE which it was our privilege to reproduce recently in *Isis* (28, 480-1, 1938); others are just satisfactory, and others still are curiously silent and meaningless. We must bear in mind when judging them, that a portrait can hardly be more attractive than the personality which it represents, and living men are not by any means equally alive. It is true enough, whether we like to admit it or not, that many distinguished scientists, though great discoveries have immortalized their names, were singularly inarticulate and unimpressive, and we cannot expect their portraits to speak more clearly to us than they would have spoken themselves.

A good portrait is almost as good as a biography, and in exceptional cases, it is better. Hence it is hardly necessary to emphasize the importance of portraits save to insist that our critical use of them must be on a level with it. Yet paradoxically enough, there are many historians who if they had to describe an individual would weigh pedantically every word, and yet will accept any portrait of him almost blindly. Think of those mussitating idiots who strain at a gnat and swallow a camel! They will hesitate interminably for this or that word of their description (is it quite correct to call him a short man, or to say that his eyes were dark, and his eyebrows very arched?) and then accept uncritically a wholesale and final account of him in the form of a portrait.

The best proof that I am not exaggerating is that there are many examples of portraits which have been wrongly identified with individuals they do not represent at all! Not errors concerning details these, but wholesale, immense errors, as if one wrote with painstaking precision the biography of JOHN DOE and then called it "The life of WILLIAM SMITH." For example, the *Photographische Gesellschaft* of Berlin published a portrait of BERTHELOT, a very good portrait indeed (I have a copy of it), the only defect in it being that it does not at all represent BERTHELOT whose name it bears, but BERTHOLLET! I often think with a mixture of amusement and sadness of the chemists who have framed that portrait and hung it in their laboratory. If they have a good visual memory, they have in their mind an image of "BERTHELOT"—which may be very precise, but is all wrong! It is almost as irremediably bad as if one were to love a strange woman in the darkness instead of the beloved one.

Another example is JAN STOLKER's fraudulent transformation of one of the heads in REMBRANDT's "Anatomy lesson" into a portrait of SWAMMERDAM (1). That portrait has been many times reproduced in textbooks on the history of science and the history of biology, and textbookmakers being what they are, we may expect to see it reappear from time to time.

No portrait should be published without having been carefully identified. This is relatively easy for modern portraits, though one's wariness should never be relaxed; it is more difficult for earlier (prephotographic) ones, and the difficulty increases rapidly with the depth of time. I do not believe there is a single ancient scientist of whose lineaments we have any definite knowledge; thus to publish "portraits" of HIPPOCRATES, ARISTOTLE, or EUCLID is, until further notice, stupid and wicked. The man who does that is nothing but a liar, and a particularly silly one at that. Authentic portraits of mediaeval times are very few. We may perhaps accept that of RICHARD WALLINGFORD and a few others; how many or rather how few I am not prepared to say. It should be noted that the identification of a mediaeval portrait is generally a difficult task, and often a hopeless one. The reader wishing to measure those difficulties is advised to read HOLBROOK's book on the portraits of DANTE (1911). He may remember also the endless discussions anent SHAKESPEARE's features.

Beginning with the fifteenth century, as the art of painting develops in the West (2), the number of identifiable portraits increases, slowly at first, then more and more rapidly. The traits of some illustrious scientists were reproduced repeatedly, and that very richness of evidence, sometimes conflicting, introduces many new difficulties. The critic having to choose between many portraits must determine their relative values, and select the best one for each purpose. The way to initiate one's self in these fascinating studies is to read the iconographical analyses which

(1) J. F. VAN SOMEREN. *Beschrijvende catalogus van gegraveerde portretten van Nederlanders* (vol. 3, no. 5431, Amsterdam 1891). G. H. PARKER. A spurious portrait of SWAMMERDAM (*Quarterly review of biology*, vol. 12, 206-9, 1937.).

(2) I have not considered Eastern portraits. There are no Islamic portraits, except relatively late Persian and Hindu ones, none of which, as far as I know, concerns the historian of science. As to Far Eastern portraits I am not qualified to investigate them. A special group of them, Japanese Confucian physicians, was dealt with recently by G. FUJINAMI (Tokyo 1937; *Isis* 28, 504-6).

have already been published apropos of VESALIUS, GALILEO, HARVEY and LINNÉ (see bibliography below).

It is high time that a historian of science endowed with a sufficient amount of artistic feeling and experience, devote himself to the study of scientific portraits, or to what might be called more generally "iconography of science." A great opportunity is waiting for the right man. If I had more time for such systematic investigations I would begin with a definite period and country, say, the Netherlands in the seventeenth century, a field of special promise because of the large number of excellent paintings and engravings which were created there and then. The best procedure would be to explore the museums and collections of engravings of that country, but a good beginning might be made if one established his headquarters in or near any collection of engravings and photographs of sufficient wealth (there are many in America). One's field might then be gradually extended to other periods or to other countries. The experience and the "flair" obtained through the iconographic study of any scientist (or any scientific event) would be of some advantage for the study of a second one, and so on.

I tried to start an iconographic tradition in *Isis* some years ago when I began the publication of the series entitled "Medallic illustrations of the history of science" (3). The series was restricted to the nineteenth century in order to simplify iconographic investigations as medals of the nineteenth century would presumably be based on the best available portraits. I was obliged to stop the series because of the lack of money, and even more so, of time, but I would be delighted to renew it, if I could find a capable and enthusiastic collaborator for that purpose. This would be the natural preparation for a regular "iconographic" department in *Isis*, the scope of which would be the discussion of every iconographic problem or controversy concerning historians of science, or scientific events, and the reviewing of relevant publications. In addition I need hardly say that relevant iconographic studies, if properly done, will aways be welcome in *Isis*, or if too elaborate, in *Osiris*. I could not publish illustrations "de luxe," at least

(3) *Isis* vols. 8 to 14 (1926 to 1930), 53 medals were completely identified, described and photographed.

not without help, but such illustrations are not needed, however desirable they may be. See for example GINO LORIA's recent study on LAGRANGE (*Isis* 28, 366-75, 1938, with six portraits and three facsimiles); this is not quite satisfactory from the purely iconographic point of view as the portraits were not discussed as I should like them to be, but it shows that the portraits can be sufficiently well reproduced in *Isis* for any scientific purpose without unnecessary luxury.

I still believe that an exceptionally good portrait should be published as beautifully as possible and that the expenditure involved, if we could but afford it, would be wholly justified, for it would be an excellent means of putting art to the service of science and scholarship, and of making men of science realize more keenly the immeasurable value of beauty. However, in such cases, even more so than in others, the authenticity of the portrait should be ascertained first, and its credentials should be fully set forth. It would not suffice, for our purpose, to publish a beautiful portrait, however beautiful it might be; we should be able to explain its provenance and vicissitudes, to name the painter or the engraver (or both in the usual case of an engraving made from a painting), to discuss the time and place of its making; in short to give all the information which an art critic would expect plus that needed by the historian of science.

The need of precision in this field is the same as in any other field. Vague knowledge is always open to suspicion. You say "This is the portrait of DONALD SMITH" without adding any information relative to it. We cannot help wondering then: "Is it really? How do you know?" But if you are able to state, "This portrait of DONALD SMITH was painted by REYNOLDS in the year 1770, we have records of the sittings... The portrait was exhibited there and there. It was owned by the family until 1853 when it passed into the possession of Lord BUCK, etc..." then we feel that we are on safer ground, and we do not hesitate to accept your statement.

I have often been thinking of these questions for the last twenty five years, but my reflections were quickened recently by the examination of an album entitled "Pictorial mathematics. Portfolio number one. Portraits of eminent mathematicians. With brief biographical sketches by DAVID EUGENE SMITH. Scripta

Mathematica, New York, 1936." I opened that volume with keen anticipation but was deeply disappointed; indeed I could hardly believe my eyes, for it would be difficult to imagine anything more topsy-turvy. This portfolio number one contains twelve portraits, to wit, of ARCHIMEDES (!), COPERNICUS, VIÈTE, GALILEO, NAPIER, DESCARTES, NEWTON, LEIBNIZ, LAGRANGE, GAUSS, LOBACHEVSKY, SYLVESTER. The portraits are well reproduced, and within the limitation of their relatively low price, as good as one might wish, but believe it or not, not a single one is explained ! Though some were created by great artists, such as HALS or SUSTERMANS, these artists are not even named, and I could discover—in that iconographical collection—no information whatsoever about the portraits included ! Instead of which, the reader is given biographical sketches which are far too light to have any value and are moreover entirely superfluous, as more abundant information of the same kind can be obtained immediately in a number of common books ! From the point of view of scientific iconography, that publication is not simply wrong, but fundamentally wrong. It will enable uneducated mathematicians to frame a dozen pictures, if they wish to embellish their classroom, but these pictures will be almost meaningless, like museum objects the labels of which have been lost. It is deplorable that so good a man as our old and great friend, Professor SMITH, allowed himself to countenance such a backward undertaking.

Let us forget " Portfolio number one " as promptly as we can and return to our main argument, which it is time to conclude. Iconographical documents are very important and very impressive, but only if they are genuine and relevant. Considering the easy and cheap means of reproduction available to-day, no biography or monograph on almost any subject of the history of science, should be deemed complete to-day without illustrations which tell in a different way another part of the story and which literally illuminate it. Yet illustrations, whatever their potential value which may be very great indeed, are worthless unless they are authenticated, explained with sufficient detail, and every doubt removed or discussed. This may entail many difficulties but the reward is great, and nobody is obliged to assume them. In the same way it is a good deal better to be silent, than to speak without knowledge. If one lacks the time, energy, or capacity to investigate

the illustrations, it is better to do without them. In that case, no harm is really done, except that the article is less complete than it would be, but one can never exhaust a subject anyhow; the illustrations may be published and explained later by another scholar. To publish unaccounted for illustrations is just as bad as, or rather worse than to publish facts for which one cannot vouch. It is a specially heinous kind of bluffing and lying which should be condemned, as I do condemn it, wholeheartedly.

Rockport, Massachusetts,
August 13, 1938. GEORGE SARTON.

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Smallsized popular publication.

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HANS TIMOTHEUS KROEBER : Die Goethezeit in Silhouetten. 74 Silhouetten in ganzer Figur vornehmlich aus Weimar und Umgebung. 180 S., 70 Taf. Weimar, GUSTAV KIEPENHEUER, 1911.

FRANZ NEUBERT : GOETHE und sein Kreis. Erläutert und dar-

gestellt in 651 Abbildungen. Mit einer Einführung in das Verständnis von GOETHES Persönlichkeit. XXX + 220 p., small folio. Leipzig, J. J. WEBER, 1919.

HANS WAHL : GOETHE. Die wertvollsten Goethebildnisse. Ausgewählt mit Unterstützung des Goethe-National-Museums in Weimar herausgegeben. 19 pl., 15 p. München, Einhorn Verlag, 1919. Folio.

HANS WAHL : GOETHE in Bildnis. Herausgegeben und eingeleitet. 70 p., 120 pl. Leipzig, Insel Verlag (no date, 1930).

HANS WAHL und ANTON KIPPENBERG : GOETHE und seine Welt. Unter Mitwirkung von ERNST BEUTLER. 306 p., 580 ill. Leipzig, Insel Verlag, 1932.

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SMITH's papers are brief lists, largely based upon his own collections, forming a good introduction to the subject, but we need more, much more.

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Pascal.—AUGUSTIN GAZIER : Port Royal au XVII^{e} siècle, images et portraits avec des notes historiques et iconographiques. Introduction par ANDRÉ HALLAYS. Folio, XII + 20 p., 130 pl. Paris, HACHETTE, 1909.

Published to commemorate the second centenary of the destruction of Port Royal.

ALBERT OJARDIAS : Divers portraits de PASCAL et des siens. (*Gazette des Beaux arts*, vol. 4, 195-207, 10 ill., Paris 1910).

C. A. SAINTE-BEUVE : Port Royal. Édition documentaire établie par RENÉ LOUIS DOYON et CHARLES MARCHESNE. 10 vols. Paris, La Connaissance, 1926-32.

The first edition of this classic began to appear in 1840. The " édition documentaire " is richly illustrated.

LÉON BRUNSCHWIG : PASCAL (86 p., 60 pl., Paris, RIEDER 1932; *Isis* 21, 375).

Vesalius.—M. H. SPIELMANN : The iconography of ANDREAS VESALIUS, 1514-64. XXXVII + 243 p., many illustr. London, JOHN BALE, SONS and DANIELSSON, 1925.

I owe a part of this bibliography to the kindness and learning of Dr. ARNOLD C. KLEBS of Nyon. I shall be grateful to readers who will kindly enable me to complete it. It is meant to include not every paper dealing with iconographical problems (many such ones are recorded in *Isis* as they appear) but only general studies of the portraits of great scientists. I shall always be ready to publish such studies, if satisfactory, in *Osiris*. G. S.

NOTE ON ALTERED PORTRAITS

American scholars who know their classics remember the story of RIP VAN WINKLE. When RIP awoke from his long sleep in the Catskill Mountains and walked down to his old village on the Hudson he was amazed at the changes which he witnessed everywhere. For example, when he reached the old inn where he had whiled away so many an afternoon he could scarcely recognize it. Says WASHINGTON IRVING " Instead of the great tree that used to shelter the quiet little Dutch inn of yore, there now was reared a tall naked pole, with something on the top that looked like a red night-cap, and from it was fluttering a flag, on which was a singular assemblage of stars and stripes—all this was strange and incomprehensible. He recognized on the sign, however, the ruby face of King GEORGE, under which he had smoked so many a peaceful pipe; but even this was singularly metamorphosed. The red coat was changed for one of blue and buff, a sword was held in the hand instead of a sceptre, the head was decorated with a cocked hat, and underneath was painted in large characters, General WASHINGTON."

This is a very good example of an altered portrait. The reader should not imagine that it was very unusual. The practice was not uncommon in earlier days. There was another practice coming close to it of preparing portraits in advance for the accommodation

of unknown sitters. Thus in early colonial days enterprising painters would roam across the American colonies with canvasses upon which they had already painted the bodies of fine gentlemen and ladies, dressed in the latest fashion; all that was lacking was the head which was then filled in to accommodate the patron. Similar customs, or worse ones, obtained in China in the case of the so-called funeral portraits (4).

While I am talking of fancy portraits, I might say a few words of the naive procedure followed by some of the early printers, who reproduced repeatedly the same portrait, even in the same book, to represent different persons ! The best example I know is the *De claris mulieribus* of the Augustinian IACOPO FILIPPO FORESTI (1434-1520), generally called Bergomensis because he hailed from Bergamo in Lombardy. The edition of that book printed by LAURENTIUS DE RUBEIS on April 29, 1497 is said to be the most beautiful book printed at Ferrara (5). It contains no less than 172 woodcut portraits of famous women of all times, but these portraits were printed from 56 blocks. That is, each woodcut had to serve for many women. " The cut depicting NIOBE, for instance, is used also to adorn the biographies of ARACHNE, ARGIA, MANTHO, NICOSTRATE, HELEN, POLYXENA, PENELOPE, VETURIA, SOPHONISBA, PORTIA, FAUSTINA, and GRISELDA. The picture of SULPICIA, the wife of LENTULUS, is also the likeness of ANTONIA, the daughter of MARC ANTONY, and of MARIA PUZZOLI, a contemporary of PETRARCH. Similarly, the portrait of Saint PETRONILLA serves for seven other Christian saints : DOMICILLA FLAVIA, MARTINA, JUSTINA of Antioch, CHRISTINE, EUPHRASIA, MARCELLINA, and ELIZABETH of Hungary." The picture of EVE between two palm trees holding CAIN by the hand and ABEL on her arm, is very plausible; and that particular cut was used only for EVE, but even in that case I am not prepared to say that it is a genuine portrait.

To return to *altered* portraits, the practice was often indulged in by mezzotinters and other engravers. Copper plates were very expensive, and the demand for definite portraits would

(4) ARTHUR WALEY. *Introduction to the Study of Chinese painting* (p. 160. London 1923).

(5) Facsimile of one page and descriptions of the work, by ZOLTÁN HARASZTI in *More books, The Bulletin of the Boston Public Library* (June 1938, 235-9).

change capriciously as the persons delineated became more or less popular. The engraver would be very tempted to transform an obsolete copperplate and produce with a minimum of alterations a new portrait for which there would be a better market. We are very well informed with regard to that practice as it obtained in England because the late GEORGE SOMES LAYARD had made a collection of such plates now in the possession of the marquess of SLIGO. LAYARD prepared a "Catalogue raisonné of engraved British portraits from altered plates" edited posthumously by H. M. LATHAM, with a preface by the marquess of SLIGO (XII + 134 p., quarto, 43 pl., London, PHILIP ALLAN 1927, 300 copies).

"The Catalogue includes plates in mezzotint, line, and stipple in which the figure, or some part of the pictorial surface has been altered in a later state to represent a different person. It is confined to plates either engraved by a British artist, or representing in one state persons of British birth or connected with the British royal family. It does not include plates in which only the title has been altered. There are 118 plates in all. Every known state of each plate is described, and the Catalogue contains descriptions of many states which have not hitherto been recorded by CHALONER SMITH or by other authorities. The earliest plate described is the line portrait of Queen ELIZABETH enthroned which was subsequently altered to JAMES I; the latest is the mezzotint of Queen VICTORIA riding in Windsor Park, in the first state with Lord MELBOURNE, and in the second with the Prince Consort."

In some cases the plates were not altered once but many times. For example no. 35 (in LAYARD's Catalogue) is a plate of which seven successive states are known, that is, which was altered six times to meet changing needs. The seven states represent, respectively, CROMWELL on horseback, a headless rider, LOUIS XIV, Louis XIV again, CROMWELL, CHARLES I, CROMWELL again ! No. 9 represented successively the Duke of SCHOMBERG, WILLIAM III, MARLBOROUGH, the prince of ORANGE and Field marshal KEITH.

There are also examples of double portraits, both altered. No. 64 illustrating JAMES I and ANNE OF DENMARK was changed to represent FREDERICK and ELIZABETH OF BOHEMIA, then again to represent CROMWELL and the symbol of Justice ! No. 87 served in turn for the Princes MAURICE and HENRY OF ORANGE, then for the Earls of OXFORD and SOUTHAMPTON, finally for GUSTAVE ADOLPHUS and JOHN GEORGE I, Elector of Saxony !

Thus far, I know of only one altered plate of interest to the historian of science, that is no. 113 of LAYARD's Catalogue, engraved

by T. CECILL. It was first used for the portrait of the poet and antiquary JOHN WEEVER (1576-1632). When that portrait did not sell any more, the skillful artist contrived to transform the poet WEEVER into the mathematician WILLIAM FORSTER (fl. 1632). The FORSTER portrait was published in the latter's posthumous(?) *Arithmetick* (London 1673) (6).

It is quite possible that some of these altered portraits are good and authentic likenesses, even as the portraits of GEORGE III and GEORGE WASHINGTON which RIP VAN WINKLE beheld before and after his long sleep may have been faithful and living images, but we have the right and the duty to be doubtful.

I have told the curious story of the altered plates in order to awaken the reader's skepticism with regard to portraits in general and teach him to be as critical in such matters as in any other historical matters.

Cambridge, Mass. G. S.
Dec. 4, 1938.

(6) I have not seen that *Arithmetick* nor the portrait, but I have consulted in the Harvard Library FORSTER's English translation of OUGHTRED's *Circles of proportion* (London 1632). There is a short biography of WILLIAM FORSTER in DNB (20, 24. 1889); see also FLORIAN CAJORI : WILLIAM OUGHTRED (Chicago 1916). The title of *Circles of proportion* is wrongly quoted by both scholars.

An alchemical poem by Kao Hsiang-Hsien

In the twenty-eighth of the ninety-nine poems which make up the *Wu Chên P'ien* (12704, 589, 9220) (1) (2). (Essay on the Understanding of the Truth), CHANG PO-TUAN (416, 9340, 12138) says...

" I dreamed that I visited *Hsi Hua* (4031, 5005) (West Beauty) and also arrived at *Chiu T'ien* (2263, 11208) (Ninth Heaven), and there I met the *Chên Jên* (589, 5624) (True Man, Sage), the *Hsien* (4449) (Immortal), by whom I was given the essay, *Chih Hsüan P'ien* (1791, 4790, 9220) (Guide to the Mystery). There is not much mentioned in this essay, and everything in it is simple and easy. Its main idea is to teach the people how to compound mercury and lead."

The commentator, TAI CH'I TSUNG (10567, 1070, 11976) says that the *Chih Hsuan P'ien* was written in beautiful language, and discussed mercury and lead, but has probably been lost. In his commentary in our MING (7946) edition (3) he includes a song, two pages long, by KAO HSIANG-HSIEN (5927, 4287, 4440), which is supposed to be similar to the *Chih Hsuan P'ien*. TAI CH'I TSUNG, also named T'UNG PU (12269, 3624), was born at *Chi Chung Lu* (906, 2211, 7365). He was a Confucian teacher and at one time administrative officer of *Shao Hsing* (9775, 4611) in *Chê Chiang* (552, 1208) Province. He wrote his commentaries

(1) For the romanization of Chinese words we have followed the spellings which are used in GILES's Chinese-English Dictionary, 2nd ed., London, 1921. As this does not completely identify the words, we have printed, at the places of their first occurrence, the numbers which correspond to the characters in GILES' Dictionary. Chinese personal names are given in the Chinese manner, family name first; thus, CHAO YÜN-TS'UNG (498, 13812, 12028).

(2) *Wu Chên P'ien*, Translation by CHAO YÜN-TS'UNG with Introduction by TENNEY L. DAVIS, *Proc. Amer. Acad. Arts and Sciences*, soon to be published.

(3) Printed during the reign of the MING Emperor YING TSUNG (13308, 11976) with the reign title *Chêng T'ung* (687, 12316) (1436-1450 A.D.).

on the *Wu Chên P'ien* during the reign of CHIH SHUN (1817, 10143) (1330-1333 A.D.), a fact which fixes the poem, which he quotes, as having been written not later than 1333 A.D. The name of the author of the poem, KAO HSIANG-HSIEN, does not appear in the *Lieh Hsien Ch'üan Chuan* (7081, 4449, 3176, 2703) (Complete Biographies of the Immortals) or in the sub-sections, *Lieh Hsien Chuan* (7081, 4449, 2703) (Biographies of Immortals) and *Tao Hsien Wên I* (10781, 4449, 12633, 5517) (Essays on the Taoists and *Hsien*) of the *Shên I Lei* (9819, 5505, 6853) (Section of Rarities) of the *T'u Shu Chi Ch'êng* (12128, 10024, 906, 762) (Complete Collection of the Literature) — and we have been able to learn no details concerning him. A translation of the poem follows.

" HUANG-TI (5124, 10942) (ancient Emperor and legendary founder of alchemy) inquired concerning the *Tao* (10780) (Way) at a cave in the *K'ung T'ung* (6597, 12271) Mountain. (4) There he got an outline of *Hsuan* (4790) (Mystery), the meaning of which was not yet thoroughly understood because the subject was then for the first time known to people. He thereupon turned his attention to the country of *Shu* (10057) [*Ssŭ Ch'uan* (10291, 2728)], where he visited T'IEN CHÊN HUANG JÊN (11208, 589, 5106, 5624) (Almighty Man of Heavenly Truth) and CHÊN I (589, 5342) (True One) in the mountain of *O Mei* (8431, 7716) (a sacred place).

" There is no better way than to knock first at the door of *Wu Ssŭ* (12792, 10284), because inside that door the elements *Chin* (2032) (metal) and *Shui* (10128) (water) can be found. *Chin* and *Shui* are known as the roots of *Huang Ya* (5124, 12804) (yellow sprout), and *Huang Ya* roots in turn are the mothers of creation.

" Behold, the mother, when she has sons, becomes a furnace and a pot ! At the time when the soul of the sun and the essence of the moon are in a state of mutual influence, when one portion sinks and the other portion floats, the pearl will fly naturally. This black pearl will fly straightway to the peak of *K'un Lun* (6537, 7466) (a mountain range). If anyone wants to get it,

(4) " In the nineteenth year after his ascension to the throne, HUANG-TI heard that KUANG-CH'ÊNG-TZŬ (6397, 762, 12317) was in the *K'ung T'ung* Mountain. He went there to consult him," etc. The whole story, translated from the *Lieh Hsien Ch'üan* (Complete Biographies of the Immortals) is printed in *Isis*, 18, 272-274 (1932).

Wang Hsiang (12512, 4287) (an aquatic monster) can be used as the means. When *Wang Hsiang* captured the pearl, it returned to the crimson chamber. The substance which sublimed in the crimson chamber stained muscle and skin with red. Behold, muscle and skin changed to red leaving only the hair in black! *Pei Tou* (8771, 11427) (the constellation of the Dipper) therefore canceled the name from the book of death. Oh, how admirable was the success of the ninety days work! It is seemly that footmarks still can be found in Bridge Mountain.

"Don't you know that SHU TUNG (10039, 12294) worked together with WEI PO-YANG (12567, 9340, 12883), that they went smilingly hand in hand into the land of *Wu Ho* (12753, 3941) (Nothing-to-do), and that they wrote the *Ts'an T'ung Ch'i* (11548, 12269, 1053) (Akinness of the Trio) (5) to be the authoritative book on *Tan* (10618) (long-life medicine) for all ages?

"The book says at the beginning that *Ch'ien* (1742) (a *Kua* (6311) which symbolizes Heaven) and *K'un* (6540) (a *Kua* which symbolizes Earth) are the gateways to change, and that *Ch'ien* represents the *Tao* (10780) of male and *K'un* that of female. The common people are not able to recognize the true *Yin* (13224) (negative principle) and *Yang* (12883) (positive principle). How can they find the Dragon and the Tiger by seeking them in the boundless universe? The moon is symbolized by *Li* (6906) (a *Kua*) and the sun by *K'an* (5870) (a *Kua*). (6) The sun and the moon, *Yin* and *Yang*, can be made to swallow one another. When the golden *Wu* (12721) (crow) dies, the jade *T'u* (12122) (rabbit) is born. Creation of all things is due to the Heaven which is influenced by the Earth. During the conjugation of male and female, the two *Ch'i* (1064) (ethereal essences) are germinatively interinfluencing. The four signs (Heaven, Earth, Sun and Moon) and the five elements (metal, wood, water, fire and earth) relate themselves in the same way as the spokes and the hub of a wheel. *Tun* (12241) and *Mêng* (7763) (the two heads of the *Kua*), day and night, all should imitate the rule of nature. It is unnecessary to watch the fire and the season with excessive

(5) *Ts'an T'ung Ch'i*, Translation by WU LU-CH'IANG (12748, 7388, 1293) with Introduction by TENNEY L. DAVIS, *Isis*, 18, 210-289 (1932).

(6) *Li* (☲) is *Yang* on the outside and *Yin* on the inside; *K'an* (☵) is *Yin* on the outside and *Yang* on the inside. *Li* actually is *Yin*; *K'an* is *Yang*.

attention, but (you should remember that) the collection (of the medicine) has a definite hour and the selection (of the materials) has a definite day. Oh, collection ! Oh, selection ! One must be cautious !"

Some of the terms in the foregoing poem, terms such as Sun and Moon for example, were in common use among the European alchemists. Others, which obviously represent the same prime two entities, are less familiar. If the poem were rewritten, the unfamiliar terms being substituted by more familiar equivalents and a few changes of imagery being made, then its paraphrase would prove to be exactly such an alchemical poem as a mediaeval Latin-writing student of the Divine Art might have produced.

KAO HSIANG-HSIEN mentions the legendary Yellow Emperor, HUANG-TI, reputed founder of alchemy, in the same manner that a European writer might mention HERMES TRISMEGISTOS.

The identity of *Wu Ssŭ*, concerning whom the *Wu Chên P'ien* also has much to say, is by no means clear. Perhaps Nature, who makes gold in her own way, is intended, perhaps the alchemist who brings together the two contrary principles, perhaps the furnace-pot, perhaps fire. The commentators on the *Wu Chên P'ien* explain that *Wu Ssŭ* (two symbolic figures) means watch-maker or go-between.

Chin and *Shui*, Metal and Water, the Golden Crow *(Wu)* and the Jade Rabbit *(T'u)*, Dragon and Tiger are synonymous respectively with *Yang* and *Yin*, Sun and Moon, with the Sulfur and Mercury of the European alchemists, with the bird and the serpent, the Red Man and the White Lady, etc. (7)

Chin and *Shui* are the roots of *Huang Ya*, and *Huang Ya*, says the sixth poem of the *Wu Chên P'ien*, is formed by the interlocking of *K'an* and *Li*. (8)

The black pearl, possibly mercury, is evidently some substance which sublimes to the most distant part of the furnace. Combined with *Wang Hsiang*, possibly sulfur, it yields a crimson color,

(7) See our Introduction to the translation of the *Wu Chên P'ien*, (*loc. cit.*), also the article, " Pictorial Representations of Alchemical Theory," *Isis*, 28, 73-86 (1938).

(8) HSIEH TAO-KUANG (4371, 10780, 6389), commentator on the *Wu Chên P'ien*, says that *Huang Ya* is the *Ch'i* (ethereal essence) of the Dragon.

possibly cinnabar, the body of which is red while the sublimate (hair) is black.

SHU TUNG was a disciple of that WEI PO-YANG who wrote the earliest known treatise on alchemy. KAO HSIANG-HSIEN refers to the *Ts'an T'ung Ch'i* for the same reason that a European writer might refer to the Emerald Table, namely, for the purpose of citing ancient authority in support of the doctrine that the work of alchemy is to be accomplished by the interaction or combination of the two contrary principles, Sun and Moon, Heaven and Earth, Volatile and Fixed, Male and Female, *Yang* and *Yin*, Sulfur and Mercury. There is however the significant difference that the *Ts'an T'ung Ch'i* describes the preparation, by means of chemical processes, of gold and of the pill of immortality, while the Emerald Table contains no alchemy but sets forth a general dualistic theory of nature. The Arab and European alchemists found that alchemical theory could be superstructed upon it.

The poem of KAO HSIANG-HSIEN, continuous in its doctrine with the *Ts'an T'ung Ch'i* and with the *Wu Chên P'ien*, supplies still another piece of evidence that the Chinese theory of alchemy is the same as that which prevailed among the alchemists of Europe.

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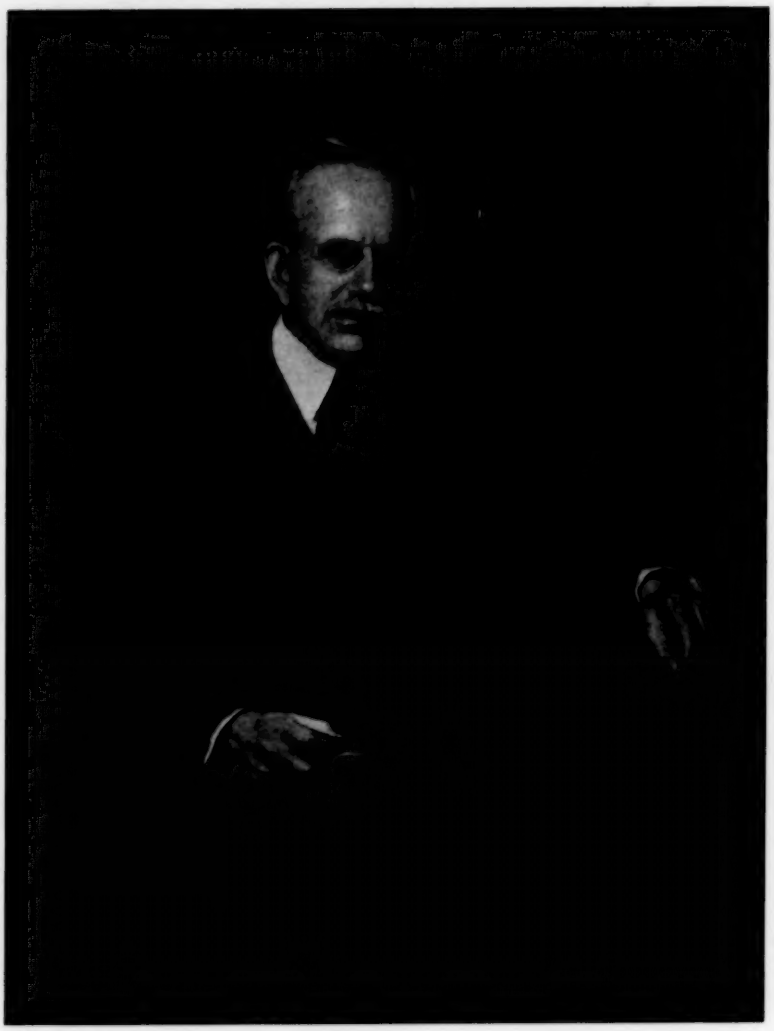
TENNEY L. DAVIS and
CHAO YÜN-TS'UNG.



GEORGE ELLERY HALE
1868-1938

From the Portrait by S. Seymour Thomas in the Possession of
The National Academy of Sciences

Isis, XXX (2), pl. 1. FREDERICK H. SEARES

UNIV. OF MICH.

George Ellery Hale

The Scientist Afield

Through these tense strings in sweeping symphony
The breezes of Aeolus oft have sung.
Through these green boughs high in the forest hung
The melodies of Pan have sighed and flung
Their sweetness on the air that crowns the hills.
Hark to these sounds when musing memory fills
With haunting dreams of other lands thy mind;
In murmuring wood-winds consolation find
For evening bells in hill-towns left behind,
For Pan-pipes blown in groves of Tuscany.

G. E. H.

Written on Mount Wilson during the early years of the Observatory, the foregoing lines record the response of an unusual temperament to an impressively beautiful scene. Their nostalgic cadence suggests moods and qualities in the man who wrote them unsuspected by the world who knew him as a great astronomer. Many also knew him as a man of vision, able to transmute imaginative creations into enduring structures; but only his intimates realized how far his varied interests led him from the field of science.

I

GEORGE ELLERY HALE was born at Chicago on June 29, 1868. His death occurred at Pasadena on February 21, 1938, after many years of ill health. His scientific career and his personal investigations have already been reviewed (1). Here, something is to be

(1) WALTER S. ADAMS, *Astrophysical Journal*, *87*, 369, 1938; HAROLD D. BABCOCK, *Publications Astronomical Society of the Pacific*, *50*, 156, 1938; ROBERT A. MILLIKAN, *Science*, *87*, 205, 1938; F. J. M. STRATTON, J. H. JEANS, H. F. NEWALL, F. W. DYSON, all in *Nature*, *141*, 501, 1938; GIORGIO ABETTI, *Consiglio Nazionale delle Ricerche, La Ricerca Scientifica*, Ser. II, *1*, N. 5-6, 1938; A. VAN

said of other activities of this brilliant and many-sided man. Since these wider interests were often related to his scientific work, his career as a scientist can not, in what follows, be entirely ignored.

HALE was fortunate in his inheritance and in his father and mother who understood and nurtured his talent. His own words (2) reveal that, and more :

His help (3) and encouragement were es-ential factors in my life. To him I owe my first interest in tools and machinery, an opportunity to pursue the work I liked best, an interest in civic, national, and international affairs, and many other advantages. To my mother, a graduate of the " Hartford Female Seminary " in Hartford, Connecticut, I am equally indebted. Her never-failing sympathy, care, and encouragement are lasting memories. From her I derived my early interest in good literature. My library contains hundreds of books she gave me, and I vividly recall my delight in HOMER, aroused in childhood when she read aloud with a friend the Iliad and Odyssey. Through her I had the good fortune to read Robinson Crusoe in its original form, and GRIMM's Fairy Tales, Don Quixote, etc., in the best translations. These and many other classics of prose and poetry helped greatly to arouse my imagination and prepare me for scientific research. Dr. E. F. WILLIAMS, who lived with us several years, took all the English reviews and had a valuable library, which was always open to me. Naturally I do not share the common fallacy of an antagonism between science, literature, and art, which appeal to me in much the same way. Creative imagination is the vital factor in them all, and I was fortunate to learn this, of course unconsciously, at an early age...

We built collecting " outfits, " including small bottles, nets, spoons, etc., and sallied forth on Saturdays in search of Cyclops vulgaris, Branchipus stagnalis and many forms of infusoria found in the ditches then existing in Kenwood. These were real adventures, as exciting as those I have had so often in later years. For I had made the discovery that simple instruments sufficed to reveal new and wonderful worlds, hidden from the unaided eye. Here was the origin of a life of research.

Two definite traits revealed themselves in these early days. I was impatient to make rapid progress : as my father used to say, I wanted " to do it yesterday." Fortunately, however, I soon learned from experience how to devote many years, if necessary, to the long task of overcoming the many difficulties presented by some cherished project. Furthermore, though deeply absorbed in every phase of my work, I constantly aimed to develop and improve my tools and apparatus...

In passing, however, I must emphasize the advantages I gained from my earlier work in other fields. It gave me a broad interest in many branches of science and taught me something of their mutual dependence. It led me to read " The Origin of Species," and initiated a lasting desire to study evolution. It taught

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MAANEN, *Journal Royal Astronomical Society of Canada*, *32*, 192, 1938; J. EVERSHED, *The Observatory*, *61*, 163, 1938. See also an earlier account by H. F. NEWALL in the series " Scientific Worthies," *Nature*, *132*, 1, 1933.

(2) Unpublished Biographical Notes.

(3) The reference is to WILLIAM ELLERY HALE, HALE's father.

me to regard the sun as a typical star, a link in the long evolutional chain, and thus helped me to avoid becoming exclusively a specialist in solar research. And it was the source of all the work I have done in helping to develop such institutions as the National Academy of Sciences, the California Institute of Technology, the National Research Council and the International Research Council (now the International Council of Scientific Unions). I still look with delight at rotifers and other microscopic objects, and realize that the marvels I saw through the little microscope of my boyhood days are as astonishing as any revealed in the heavens by the largest of telescopes...

The emphasis I have placed on my work at home is not excessive, as I never enjoyed the confinement and the fixed duties of school life. Born a free lance, with a thirst for personal adventure, I preferred to work at tasks of my own selection. However, I went through the Oakland Public School, and then entered Allen Academy, which proved to be a fortunate choice...

My father was closely associated in business with DANIEL HUDSON BURNHAM, the well-known architect who supervised the design and construction of the Columbian Exposition of 1893 and later became the leading city planner of the United States. It was doubtless through him that I acquired my lasting interest in architecture and city planning, which I subsequently put to practical use in connection with the building of the National Academy of Sciences in Washington and the initiation of the City Planning Commission of Pasadena. My interest in machinery and in science naturally suggested further studies in these fields, and at Mr. BURNHAM's suggestion my father chose the Massachusetts Institute of Technology, which I entered in the autumn of 1886.

At this point I must insert a word regarding our summers in Madison, Connecticut, the crowning delight of each year from my early childhood. I could write a book on the marvelous excitement of our annual transition from the busy life of a middle western city to the quiet pleasures of an old New England village. The large summer colony of the present day had not developed, and motor and trolley cars were of course unknown. My grandmother's house, after an existence of nearly two hundred years, held a background and an atmosphere unknown in Chicago. Ox-carts moved placidly through the streets, and the characteristics of the inhabitants of the village were an endless source of interest. Daily swims in Long Island Sound, building and racing model yachts, hours at the old shipyard, and my initiation into fly-fishing for trout are among the vivid memories of these idyllic summers. I can still hear the voice of the locust from the umbrageous trees as the Rev. Mr. GALLUP reached the tenth caption in his Sabbath Day discourse, and the striking of the noon hour told us impatient children that we were soon to be released to attack broiled bluefish and other delicious fare. It is a great satisfaction, in these post-War days, to have had some small part in the old Puritan civilization which crossed the Atlantic from England, our ancient home.

During his student years at the Massachusetts Institute of Technology in 1886 to 1890, HALE was busy whenever possible at the Harvard Observatory, and yet he found time to indulge his growing interest in music and art. The orchestral concerts of Boston and its exhibits of pictures had his attention. Nevertheless, his scientific interests stood first, and he had no sooner finished at the Institute than his private observatory at Kenwood began

to take form. It was then only a short generation since the formulation of the principles of spectrum analysis. Astrophysics as a word was scarcely known; but from the first HALE realized the tremendous developments that might follow from applications of the instruments and methods of physics to the problems of astronomy. The development of this idea was one of his great contributions to science and, indirectly, the origin of the first of the many cooperative undertakings, often international in scope, which HALE so skilfully organized. Obviously the union of physics and astronomy would be greatly aided by a special journal for the publication and discussion of astrophysical results, and most effectively if European astronomers and physicists could be interested in the project. It was the first example of HALE's way of approach to a new undertaking, which he sometimes expressed simply in the phrase, " Make no small plans."

Visits abroad in 1891 and 1893-4 gave him the international support he felt essential for the success of his plan. *Astronomy and Astrophysics* thus emerged from the old *Sidereal Messenger* and appeared during the years 1892 to 1894, to be followed, on a firmer foundation, by the *Astrophysical Journal*, international in its contributors and readers, which has always been recognized as the leading publication in its field. HALE's procedure in this undertaking worked so admirably that he used it repeatedly, and often in matters unrelated to science. Its basis was indeed to make no small plans; but in practice it meant having a plan so sound and inviting that those most competent to advise and assist could not resist the allurement thus held before them.

Those early visits, which included England, led to many personal contacts. Warm and lasting friendships were formed, often with men of an older generation such as Sir WILLIAM HUGGINS, the pioneer in stellar spectroscopy, and Sir DAVID GILL, then still director of the Royal Observatory at the Cape of Good Hope, and especially Professor H. F. NEWALL of Cambridge. On the continent, too, HALE found friends. A winter at the University of Berlin established scientific relations with HELMHOLTZ, PLANCK, RUBENS, and others; but notably with VOGEL and SCHEINER, then active in the new field of stellar spectroscopy. Personal relationships, then and later, were always important in HALE's career. Even in his early twenties, in the invention and use

of the spectroheliograph, he had a brilliant achievement to his credit; his widely varied interests and his eager enthusiasm caught instant attention; but for what he was himself people took him to their hearts.

The gloom of the winter in Berlin was followed by the sunshine of Italy. The glamour of England as a center of science had been felt from his boyhood days and was never dispelled; but after all, as he sometimes remarked, he was a true son of the south. Of English ancestry, the English tradition was to him the soundest element in our American life; and England, as the source of our institutions and our liberties, was a second home. But the Renaissance had played its own large part in our origins; Italy embodied the romantic past, and he remained always under the spell of villa gardens and a landscape of rugged hills, stone pine, and cypress.

Meanwhile, plans for the Yerkes Observatory were well under way, set off in HALE's brain by a chance remark of ALVAN CLARK's that the glass disks for a 40-inch objective were in the market, ready cast. President HARPER of the University of Chicago and HALE together had induced Mr. CHARLES T. YERKES to provide for the telescope and its mounting, but there were serious difficulties about funds for the site and the building. Nevertheless the Observatory was ready for dedication in October, 1897, and out of the scientific congress arranged for this occasion by HALE grew the American Astronomical Society.

The organization and development of the Yerkes Observatory were determined by special circumstances and only partially satisfied the requirements imposed by HALE's ideal of a unification of physics and astronomy for an attack on the problem of stellar evolution. President HARPER was sympathetic and the University did as much as could be expected of an institution just founded and faced by innumerable demands for money. HALE's father, Mr. WILLIAM ELLERY HALE, had purchased a 60-inch disk for the large reflecting telescope needed for the study of stellar spectra and for five years had paid HALE's salary as a member of the faculty of the University; and HALE himself had assumed the responsibility of finding funds to maintain the staff of the Observatory. Other donors helped too, but the continued support of the *Astrophysical Journal* and the further development of the Observatory presented

a depressing outlook. It was at this stage, in 1902, that a chance-read item in a Chicago newspaper brought word of Mr. CARNEGIE's first gift for the foundation of an institution to be devoted wholly to scientific research. This was news almost too good to be true.

The dramatic story of the foundation of the Mount Wilson Observatory of the Carnegie Institution of Washington in 1904 can not be related here; but it includes such exciting incidents as HALE's securing certain critical test observations on Mount Wilson and rushing down the eight-mile mountain trail to catch a last possible train to the East—observations which determined the Carnegie Institution to support an expeditionary undertaking on Mount Wilson and, through that, a few months later, to provide for a large telescope, the 60-inch reflector, and thus start on its way the larger project of a fully equipped observatory.

The foundation of the Mount Wilson Observatory transferred HALE to an institution devoted wholly to research and opened the way to a realization of his matured plans for comprehensive astrophysical investigations, in which the sun took its proper place as the one star close enough to us to be studied in detail. Removal to California also solved a serious personal difficulty for HALE by relieving a growing anxiety as to his daughter's health.

II

In the intervals between maintaining the existence of one observatory and bringing another into being HALE was busy with plans for an organization which, like the *Astrophysical Journal*, was international in scope and grew naturally out of his program of observation. Successful interpretation of the rapidly-changing phenomena of the sun's atmosphere demands as continuous a record as possible. Cooperation between observers in different longitudes would greatly lessen the interruptions due to hours of darkness and bad weather; moreover, the resulting personal contacts and discussions would greatly stimulate study of the sun. The outcome was the International Union for Cooperation in Solar Research, organized during the scientific congress of the St. Louis Exposition in 1904, which functioned actively until the break in international relations in 1914. In order that this new organization might operate with the greatest effectiveness, it was characteristic

of HALE to see that it had the backing of the National Academy of Sciences and, as far as possible, of the academies and learned societies of other countries.

A picturesque memory of the early days of the Mount Wilson Observatory is the fourth conference of the Solar Union which took place on the Mountain in 1910. Besides the Americans, about thirty-five foreign scientists, some accompanied by their wives, made the slow journey by carriage over the rather terrifying mountain road or by mule or burro over the steep and narrow trail. The primitive conditions of the mountain top of those days are reflected in the remark of a sheltered being who, after one hasty look on arrival, said " it is no place for a lady " and started for Pasadena at once. The only shadow was HALE's illness. The first of his serious breaks in health had occurred a few months earlier. He was able to welcome the visitors but could take no part in the discussions.

The Solar Union was the first important venture in which HALE drew upon the resources of the National Academy of Sciences. He had been elected a member of the Academy in 1902 and to the Council in 1903. In those days the Academy had no home of its own. Its members were worthy representatives of science, but rather oblivious of the younger generation that had grown to maturity and acquired merit. The elections to membership in any one year were limited to five, and many qualified to enter could not gain admission.

From his youthful days HALE had always been impressed by the services rendered to their respective countries by the Royal Society of London and the French Academy of Sciences. Why should not the National Academy step into its rightful position as a living force in American Science? On HALE's initiative the annual admissions were increased to ten and later to fifteen, and various other steps were taken to strengthen the work of the Academy and make it significant. During several years he studied the organization of the academies of the world and pondered on their relationship to national welfare. Gradually his ideal for our own Academy took form. The results of these studies appeared in *Science* in 1913 to 1915 and later as a volume, *National Academies and the Progress of Research*. The articles and the attendant discussion led to the establishment of the *Proceedings*

of the Academy, now in its twenty-fourth volume, and later to a gift of five million dollars by the Carnegie Corporation for the construction and maintenance of an Academy building and for the endowment of the National Research Council. To purchase the site, about two hundred thousand dollars additional were found by private subscription. The dedication of the building in 1924 was the culmination of the plans of nearly twenty years. But after all, a journal and a building were only means to things desirable but much less tangible. The real aim was to encourage research and assimilate its results to our national life. The activity of the Academy in these recent years well attests the success of HALE's tireless effort.

Mention of the National Research Council recalls the wartime years. Familiarity with foreign affairs together with several unusual personal experiences abroad had led HALE to believe that war was inevitable; and in 1915, fearing that the United States might become involved, he suggested that the services of the Academy be offered to the President of the United States to aid in preparatory measures. A renewal of the proposal in 1916 brought the matter before the body of the Academy. An almost unanimous approval was followed by a formal offer, which was promptly accepted by President WILSON.

The plan was to develop under the charter of the Academy a separate organization, with a membership much wider than that of the Academy itself, representing all the scientific and technological resources of the nation. The interrelations thus established would provide the best possible means for utilizing these resources. The National Research Council thus came into being, with HALE as its first chairman. Although the Council was created as a war measure, HALE saw that it could be equally effective in promoting the scientific interests of the country in peacetime, and after some effort induced President WILSON to issue an executive order making the Research Council a permanent organization.

From 1910 on, as Foreign Secretary of the National Academy, HALE had attended meetings of the International Association of Academies, held from time to time at various points in Europe to consider questions of mutual interest. In 1918, on his suggestion, the International Research Council (since 1931 the International Council of Scientific Unions) was established as a substitute for and

on a broader basis than the old Association, which could not be continued into the post-war years. The organization began with the allied and the neutral nations in the hope that the central powers would eventually join. At the Brussels meeting in 1919, Unions were established for several different sciences in order that the international cooperative relations disrupted by the War might be resumed and extended. The International Astronomical Union, for example, took over the work of the old Solar Union and the Carte du Ciel, and developed new cooperative undertakings which, generally speaking, have been successful and highly advantageous. By 1931 forty countries had joined the International Council, and eight different Unions had been established.

The actual accomplishment of these organizations in relation to national and international life is of public record and need not be described here. HALE's wish to promote research has in large measure been fulfilled; if his hope that the non-nationalistic cooperation of scientists might in time lead to improved international relations in other fields has not yet been realized, the failure is scarcely that of the plan. Since the essence of all these undertakings was cooperative effort, the loyal support of many co-workers is to be taken for granted. That HALE was interested only in things so well worth doing as to command wide support was a large element of his success; but he could not have so fully engaged the efforts of others had not his own efforts been so completely disinterested.

III

The development of the California Institute of Technology under the leadership of Dr. ROBERT A. MILLIKAN in accordance with broad policies worked out jointly by HALE, MILLIKAN, and Dr. ARTHUR A. NOYES is well known. The events of the earlier years, which brought NOYES and MILLIKAN upon the scene, are less familiar, however. Not long after HALE's removal to Pasadena, he was asked by the trustees of Throop Polytechnic Institute for advice on the future development of that school and, a little later, invited to accept membership on its governing board. This institution, which was a miscellany of departments, including an

elementary division, a division of manual training, and a school of art, had satisfied certain early needs of the community. Further development along these lines did not seem promising; but HALE's sense of social obligation inclined him to accept the invitation on condition that the authorities would join with him in the creation of a technological institution of first rank. With little endowment available and with no certainty of procuring more, it was a daring venture, indicative of HALE's courage and the calibre of the men who accepted his challenge. The transformation began. Dr. J. A. B. SCHERER became president, and gradually students were shifted to other schools until the original five hundred were replaced by thirty of college rank. To meet new demands the faculty was strengthened; and to proceed most effectively effort was concentrated on science and a few branches of engineering, but with rather unusual emphasis—for a technological school—on broad humanistic studies.

To HALE, however, an institution of first rank meant research. Slowly the work in science was broadened beyond that required as an introduction to engineering, with strong schools of instruction and research in all the fundamental sciences as the ultimate aim. A significant feature of the plan, as it grew in HALE's mind, was a close cooperation between the Mount Wilson Observatory and the new institution (4). Behind this cooperative scheme was his old ideal of a combination of all the resources of physics and astronomy for an attack on fundamental problems, now more urgent than ever since it had become clear that the stars themselves were important to the physicist. The Observatory had its own physical laboratory, but not one permitting investigations on the scale clearly required.

The difficulties were great. Money was needed, and men; men qualified by talent and training to play a part in such a program. Few such were willing to leave the academic centers of the country for an isolated Western community and stake their fortunes on the future of an undeveloped institution. At length, however, success came; first, in NOYES, of the Massachusetts Institute of Technology, a distinguished scholar and teacher,

(4) Known as Throop College of Technology from 1913 to 1920, thereafter as California Institute of Technology.

under whose direction the Gates Chemical Laboratory quickly became a great school of instruction and an important center of chemical investigation; and then, after the resignation of SCHERER as President, in MILLIKAN, who came as chairman of the Executive Council (replacing the President) and director of the Norman Bridge Physical Laboratory.

With these appointments secure the strain lessened, for HALE felt that the ultimate success of the California Institute was then assured, as in fact it was. The events behind these appointments had taxed HALE's resourcefulness to the utmost. In the decisions which had to be made, particularly in that by MILLIKAN, it was literally a balancing of what one man could offer against the united counsel of MILLIKAN's friends and advisors in the East. Very tangible inducements in the way of generous funds for research were invitingly displayed at both points in the country. HALE and the California Institute won; but HALE had to find the tangibles. Most such details, as well as those of the later years of his association with the Institute and his part in starting the 200-inch telescope on its way, must await the space of a full biography.

IV

Although research stood first and the cooperation of the Mount Wilson Observatory and the California Institute filled much of his thought, the value of humanistic studies for scientific students and of a rounded intellectual atmosphere for the community was never far from his mind. We thus naturally find HALE as the first president of the Pasadena Music and Art Association and, from the beginning, a trustee of the Henry E. Huntington Library and Art Gallery.

HALE's relations with Mr. HUNTINGTON are recounted here at some length since they have hitherto remained unknown except to a few of his close associates (5). The two men first met at a

(5) For background material necessarily omitted from the condensed statement of the following paragraphs, see the biographical sketch, " HENRY E. HUNTINGTON," by ROBERT O. SCHAD, *Huntington Library Bulletins*, No. 1, 1931; and, in the same *Bulletin*, " Huntington Library Collections "; also, by GEORGE ELLERY HALE, " The Huntington Library and Art Gallery, the New Plan of Research," *Scribner's Magazine*, vol. 82, p. 30 (July), 1927.

public dinner in 1906. As Mr. HUNTINGTON had already begun to gather the treasures that have made his name famous, the talk not unnaturally drifted to books and book collecting; and so apparently it always did in later meetings. On one occasion, probably about 1912 or 1913, Mr. HUNTINGTON asked HALE's opinion as to the final disposition of his collections—whether they should go to some institution in New York or be brought together at San Marino (6), adjoining Pasadena, where he had already established his home. The import of Mr. HUNTINGTON's question is not now wholly clear, since there is evidence that by 1907 he was already planning for a permanent collection of books and art objects at San Marino. About 1911, however, he had startled the world of collectors by buying outright three or four of the finest private libraries of rare books in existence. It is possible that the great value of the collections thus brought together may have reopened in his mind the question of disposition, or it may have been merely that he wished to know HALE's reaction to a decision already taken. The important detail is HALE's response to the suggestion that the collections might eventually become available for public use in the immediate vicinity of the Mount Wilson Observatory and Throop College of Technology. In his reply HALE told Mr. HUNTINGTON of his hopes for the development of broad intellectual and artistic activities centered about these institutions and said how admirably the presence of books, manuscripts, and pictures of such rarity and historical importance would harmonize with this plan. Mr. HUNTINGTON

> listened with interest but remained undecided. Recognizing his independent character and his natural desire to choose for himself, I did not press the matter, but waited in the hope that another favorable opportunity might present itself (7).

In occasional meetings during the following months the two men continued to find a common ground of interest and sympathy in Mr. HUNTINGTON's treasures. In April 1914, in New York, at Mr. HUNTINGTON's invitation, they visited together the remarkable Hispanic Museum, founded by Mr. ARCHER HUNTINGTON. While motoring back, Mr. HUNTINGTON said he had decided to transfer the remainder of his collections to

(6) Many of the rarest books were still in New York.
(7) Biographical notes.

San Marino and that eventually they would all become public property. The arrangement provided was such that the responsibility for administration of the collections would have been in the hands of elective officials. As HALE said later, " Realizing the menace inherent in political control, I took my life in my hands and wrote him a letter."

This letter (April 17, 1914), expressing pleasure that the books and pictures eventually would be available for public benefit in California, ventured to ask consideration of the advantages of another form of control, namely, a special body of trustees selected because of their knowledge, experience, and breadth of interest, as had been done in the case of the great funds established by Mr. CARNEGIE and Mr. ROCKEFELLER. Such a plan would better insure the care of the collections. And more; the value of the collections would

> depend in large degree on the means employed to educate the public to appreciate and use them, and the establishment of widespread relations with scholars at home and abroad who are prepared to utilize the library in the best way. Under suitable administration it could be made a center of study and research of international importance. The books would then serve not merely as rare and interesting curiosities, glanced at by many, appreciated by few, but as a continual source of literary and historical study, which would make them known and valued by thousands otherwise ignorant of their existence.

It is noteworthy that the purpose outlined by this citation, although later amplified in matters of detail, is the guiding principle embodied in the research institution that the Henry E. Huntington Library and Art Gallery is today. Even then the collection was a great aggregation of rarities, in which HALE had quickly recognized a rich mine of source material.

Mr. HUNTINGTON acknowledged this letter promptly (April 20) but briefly, saying, however,

> Some of your suggestions are most excellent and I will take them under consideration.

On May 11, 1914, HALE again wrote at length, beginning :

> The powerful attractions of your pictures and library have fired my imagination, and set in motion a new train of ideas. I can't help feeling that with such rich and uniquely valuable material it would be a very easy matter to make your collection of real international importance, without greater expenditure than you may already contemplate. I have had some experience in starting international pro-

jects, and have learned that it is quite as easy to acquire the hearty cooperation and support of the best men in Europe as to carry out an enterprise of merely local significance. The one thing essential is to have a project so well worth doing that it appeals as strongly to Europeans as to Americans.

Continuing, HALE amplified his earlier suggestions as to means by which the value of the books and pictures could be utilized most effectively, pointing out at the same time ways by which the international importance of the collections as a center for research might be enhanced.

Mr. HUNTINGTON did not reply until October 5. Then he wrote, in part :

Your letter of May 11th reached me as I was sailing for Europe and during the summer I have given the suggestions some thought. I am not ready to reply, but it is quite possible that you have planted a seed.

Thereafter, they occasionally discussed the best mode of control, but HALE talked mainly of the collections themselves, with which he had by that time become surprisingly familiar, leaving the wider plan for subsequent development. It was not until March 1916 that he felt ready for another definite move. In the meantime the work of the Mount Wilson Observatory had broadened, the 100-inch Hooker telescope was approaching completion, and the larger plans for Throop College of Technology were developing. The importance of Pasadena as a center of scientific research was assured. The Pasadena Music and Art Association, in which both men were interested, was then an important factor in the artistic life of the community, and HALE was eager that means be found to develop humanistic studies.

On March 22, 1916, he wrote a carefully worded letter, but finally decided it would be wiser to talk with Mr. HUNTINGTON, who willingly made an appointment. With assurance from Mr. HUNTINGTON during the meeting which followed that suggestions would not be unwelcome, HALE, on March 28, drafted a concrete plan, embodying the principles expressed in his earlier letters which had been discussed a few evenings previously, but somewhat broader in scope than that eventually adopted.

With apologies for delay, Mr. HUNTINGTON replied on April 22, 1916 :

Regarding the suggestions you so kindly make, I may say, the mode of organi-

zation is in line with my ideas and I hope, with the aid of Mr. ARCHER HUNTINGTON, to develop and formulate some such plan...

It will probably be some little time (at least until times are better) before I take up this matter actively, as you of course can understand.

The cordial and friendly relations which by this time had been established are even more clearly reflected in a note to HALE from Mr. ARCHER HUNTINGTON, written on May 15, 1916 :

... I am delighted to know, as he [Mr. H. E. HUNTINGTON] of course knows, of the value of such a friend as yourself near at hand, and he will of course appreciate the value of such a coadjutor. I should be most happy to talk with you of this, for I am keenly interested in the great undertaking, but I am unfortunately not free on Thursday or Friday. I can only therefore express, as he would express, an unbounded appreciation of such interest as your own in a matter which must eventually have vital importance in your City and State (8).

At this stage HALE was drawn into war work and could do little or nothing more until his return to Pasadena in the summer of 1918. As a matter of fact, no further development took place until a year later, when Mr. HUNTINGTON called on HALE at the Observatory Office in Pasadena and outlined the plan he had finally adopted for the disposal of his collections. The library building at San Marino and its contents were to be transferred at once to a board of five trustees—HOWARD E. HUNTINGTON, ARCHER M. HUNTINGTON, WILLIAM E. DUNN, GEORGE S. PATTON, and GEORGE E. HALE—entrusted with full power of control and management, not to be exercised, however, during the lifetime of Mr. and Mrs. HUNTINGTON. The trust indenture which made the Henry E. Huntington Library and Art Gallery a reality was dated Aug. 30, 1919. Later indentures and bills of sale transferred the remainder of the library, the pictures and other art objects, the house and 200 acres of the estate.

The first step in the plan that HALE had long hoped might be brought about was thus taken. Although the trustees met with Mr. HUNTINGTON from time to time in a general advisory capacity, it was Mr. HUNTINGTON himself who, as in former years, determined what additions should be made to the collections. Purchases still continued on a lavish scale, but about 1920 they began to change in character. The market had been stripped of its choicest items, and a filling-in process then began which still

(8) Quoted with the permission of Mr. ARCHER HUNTINGTON.

further increased the historical value of the library by adding quantities of state documents, family papers, manuscripts, letters, etc., never before accessible to the student. The Battle Abbey papers, for example, and rich collections of Americana belong to this period. Means for utilizing this rich material thus became more desirable than ever.

Mr. HUNTINGTON was not an ordinary collector, interested only in the rarity of his treasures. HALE found him to have

> a keen and intelligent pleasure in the contents of his books and manuscripts and an affectionate appreciation of his pictures and other works of art (9).

As the years passed they became his passion, and his knowledge and appreciation grew; but he made no pretension to scholarship in the technical sense and time was required for him to realize the extraordinary value of the collections to the scholar and to adjust his viewpoint to that of a patron of research.

HALE's larger plan could not be pressed, and it was not until 1925 that events began to move toward a final adjustment. Only the most significant matters can be touched upon here. After visits to numerous European libraries and to the J. Pierpont Morgan Library in New York, and many discussions with his fellow trustees and others competent to advise, HALE formulated a statement of policy concerning the future development and the research activities of the Library. This important document was approved by Mr. HUNTINGTON on October 14, 1925, and formally adopted by the trustees four days later. It provided that

> the library should be placed under the direction of a great and productive scholar, aided by a permanent corps of original investigators of the highest calibre, in addition to its present excellent librarian and staff.

As the general subject of research, which was determined almost automatically by the character of the library, it suggested :

> The origin and progress of the civilization of the English-speaking peoples, with special reference to their intellectual development.

It also outlined means by which the general public might benefit from the collections—through frequent exhibits of rare books and manuscripts in commemoration of great events, anniversaries,

(9) Biographical notes.

and discoveries, and by the admission of visitors to view the paintings, tapestries and other art objects (10).

HALE's papers show the forethought given to the formulation of this statement of policy and the care with which he had prepared it for presentation to Mr. HUNTINGTON and the trustees. An argument used effectively on various occasions was that, without some such program, the Huntington Library would be in the position of a Mount Wilson Observatory provided with powerful and costly instruments which were only shown to the public and occasionally used by visiting astronomers for observations in which they happened to be personally interested.

Legal authority for putting the new plan into operation was still lacking, however. This was secured by a supplemental trust indenture, executed by Mr. HUNTINGTON on February 8, 1926, which redefined the nature and object of the Henry E. Huntington Library and Art Gallery, by including the essential features of the statement of policy approved in October 1925, and broadened the powers of the trustees to correspond to the new definition of purpose.

For the success of all these negotiations HALE always gave much credit to Mr. GEORGE S. PATTON, chairman of the trustees and Mr. HUNTINGTON's intimate friend and trusted advisor. PATTON was quickly convinced of the soundness of the plan and supported it strongly. In important decisions it was often his word of personal advice that finally turned the scale.

The difficult question of a Director of Research was happily answered a year later by the appointment of Dr. MAX FARRAND on February 5, 1927. The even more difficult matter of an endowment adequate to the support of the project, which was still unsettled, was also provided for at this critical meeting of the trustees. In this emergency, as occasionally in others when large matters were at stake, HALE appealed to Mr. ELIHU ROOT, for whose opinion Mr. HUNTINGTON had high regard. Mr. ROOT's telegraphic response (January 12, 1927) warmly commended the plan, and continued,

But do not underestimate the magnitude of the task. For many years I have

(10) During the ten years following the opening of the Library and Gallery on January 28, 1928, the total number of visitors admitted was 1,344,672.

been active trustee of Metropolitan Museum devoted to art, New York Public Library devoted to literature, and Carnegie Institution devoted to scientific research. In every one funds which seemed at first ample proved too small to do the work properly and we have to secure additional means by hook or crook.

There is little doubt that this telegram aided materially in fixing the amount of the generous endowment finally made. In connection with the change of policy which was thus put into effect, Mr. HUNTINGTON is said to have remarked to Mr. PATTON, "Patton, I never had any idea of doing anything of this kind."

Three and a half months after the important meeting in February Mr. HUNTINGTON died, on May 23, 1927.

V

HALE's Biographical notes tell of the family friendship with Mr. D. H. BURNHAM, distinguished for his contributions to city planning. This association had unforeseen consequences on the Pacific Coast. In 1921 Mrs. BURNHAM sent HALE a copy of the "Life" of her husband by CHARLES MOORE. This account of BURNHAM's fine work, then just published, recalled the beginnings of HALE's own interest in city planning, dating back to the early nineties. During those years BURNHAM supervised the design and construction of the Chicago Exposition of 1893 and prepared the plans for the interconnecting parkway along the lake front. HALE used frequently to visit the drafting rooms to pore over the sheets of drawings then in preparation. The appreciation thus acquired of problems involved in such designs was never lost. Many years later, when locating the building of the National Academy of Sciences, HALE's interest in city planning was again actively aroused by his dealings with the National Commission of Fine Arts at Washington. It was therefore natural enough that the arrival of BURNHAM's "Life" should have fired his imagination and stirred him to instant action. What more fitting than a planning commission for his own city to study its needs for highways, parks, and public buildings? The time was right, since the library and the municipal offices were outgrown, and the city officials were men of judgment and character with whom one could work.

As usual with HALE, things began to happen at once, and

shortly he was expounding the alluring possibilities of systematic city planning to a deeply interested group of City Directors. It was so logical, so practical, so eminently desirable. One had only to look at the transformation of Washington, of Chicago, of Detroit, of Cleveland to see what beauty might come out of ugliness, and note the testimony of their inhabitants to remove any doubt about a return on the large expenditure required. To make a city attractive was to make it prosperous. But such plans had gained the full measure of success only when handled by experts, rare beings who were half artist, half engineer. Unless one were ready to recognize its exacting demands on talent, city planning ought not to be undertaken at all. Mr. BURNHAM himself (another man aware of the futility of small plans) had eloquently preached the gospel :

> Make no little plans; they have no magic to stir men's blood and probably themselves will not be realized. Make big plans; aim high in hope and work, remembering that a noble, logical diagram once recorded will never die, but long after we are gone will be a living thing, asserting itself with ever-growing insistency (11).

There was no gainsaying proofs and arguments such as these, and soon a Planning Commission was at work, in consultation with Messrs. BENNETT and PARSONS of Chicago, of whom Mr. BENNETT had for eight years been intimately associated with BURNHAM. Then began the education of the community; and by some mysterious alchemy known to those skilled in such matters the whole scheme, although still firmly in the hands of the Commission, presently became in the eyes of the public the purpose of a representative group of citizens drawn from all the organizations in the city, and the Planning Commission itself only an instrument for the achievement of that purpose. All that need be recorded here is the complete success of the undertaking. Pasadena acquired its logical plan for highways and parks and a group of public buildings designed by able architects. Although in ill health and abroad part of the time, HALE served as a member of the Commission; and a thick file of correspondence shows how closely he watched and guided the course of events.

The citizen of Pasadena may have pride in the local Observa-

(11) DANIEL H. BURNHAM, By CHARLES MOORE, vol. 2, p. 147, 1921.

tories and Institutes, although they do not usually touch his life very closely; but to be able to visit his own public library, designed with grace and distinction, or even to pay his taxes in a beautiful building, is an intimate matter which evokes a warmer response. HALE is remembered by the community with gratitude for having given it something that is peculiarly its own.

VI

No summary of HALE's many interests would be complete without some reference to the fascination that Egypt always held for him. In his younger days it was perhaps mostly the enchantment of far-off ancient things, but later, although the enchantment remained, it became a matter to which he gave serious study. The rays of Aton above the doorway to his Solar Laboratory in Pasadena were more than a decorative device. The Valley of the Nile, with a significant history longer than that of the Christian era, held the story of the rise of man to civilized state. It had been the scene of dramatic events in a great evolutional phenomenon, and from his boyhood days when he absorbed the words of DARWIN all evolutionary change held HALE's attention.

The story is bound up in his friendship with the orientalist JAMES HENRY BREASTED and is to be read in the hundreds of letters of the two men to each other over a period of more than twenty years. The correspondence is most remarkable. Each man was the confidant of the other. Both were dealing with large affairs in widely separated fields, and yet there was always mutual comprehension. BREASTED, a humanist with the outlook of a scientist, used every resource of science that could be brought to bear on his problems; HALE, the scientist, had highly developed humanistic interests and the background and enough specialized knowledge to appreciate the significance of BREASTED's great work, in which he took the keenest delight. Moreover, in certain respects the two men were alike. They had the same buoyant enthusiasm, the same imaginative grasp on broad fundamental problems, the same driving force to accomplish great ends; and both were adepts in the art of making " no small plans."

HALE's dreams for new telescopes and for the National Academy, the California Institute, and the Huntington Library, besides

striking summaries of his own work on the sun, went into his letters; and from BREASTED there came fascinating accounts of the "recovery of the lost story of the rise of man," diversified by paragraphs in which with a flash of genius some intricate matter would be set forth in all clarity, or by dramatic stories of the WIMBOURNE sculptures, or of a dangerous scientific journey across the new Arab state that suddenly found itself transformed into a diplomatic mission ending in London, or of tense moments in the tomb of TUTENKHAMON as the heavy lid was slowly raised from the sarcophagus of the king.

The association was a valued thing in the lives of both men and a source of influence on each. HALE's historical sense was intensified, his synthetic view of events broadened; and in the evolutional sweep of civilization he found the sequent of things beginning within the atom of the physicist. BREASTED's instinctive approach to archaeological problems through the methods of science soon became a set purpose which seized upon all the aids afforded by geology, physiography, and paleontology; and, besides, he gained the example of HALE's skill in planning large undertakings. As events fell out, HALE played a significant part in some of BREASTED's affairs. After his brilliant and adventurous achievement in recording the monuments of upper Egypt, BREASTED was obliged in 1907 to return to his academic duties at the University of Chicago. President HARPER, his old teacher, who sympathized with his desires, had died the year before, and the University could no longer support field work on the monuments, which BREASTED wished to extend to the mouth of the Nile. The situation was discouraging. BREASTED was the only teacher of Egyptian in the United States; and he could find no acceptance of the ideas that ultimately brought him success. Finally, after having almost lost hope, he came again in contact with HALE, whom he had known in earlier years.

On April 25, 1931, BREASTED wrote HALE :

> I don't think I would ever have had the courage to go on, but for you. It is now nearly twenty years since you came out here to see me, and took me down to the University Club to lunch. What you said that day gave me a new lease of life.

Years before, on April 7, 1914, he had written :

> I cannot begin to tell you how much good your visit has done me. I find nowhere else such a broad outlook as yours.

And again on the same day :

> Our conversations and the reading of your paper have quite restored my enthusiasm for research in America. I owe you a great deal.

Again and again during the many intervening years there is this same note of acknowledgment.

On April 9, 1914, BREASTED wrote :

> Since your departure last night large and comprehensive plans have been fermenting in my mind until they give me no rest. These plans, if carried out, would correlate a whole group of subordinate projects and thus form a dominating and directing enterprise in the entire field of research in the ancient world, if not in that of the humanities as a whole... This would fill out the later portion of the grand evolutionary development which you are planning to have presented in the new course of lectures you have founded for the National Academy.

The plans in question included a " comprehensive survey of the career of early man and the preservation and study of his monuments in the eastern Mediterranean." The problem was money to put them into effect. HALE was as eager as BREASTED himself; and together they then began a series of attempts to interest men of wealth in the project, which, as BREASTED later remarked " failed utterly to open any blind eyes." One likely individual, approached by HALE with the greatest circumspection, was found afterward to have been much more interested in preparing a tomb for himself than in exploring the tombs of ancient pharoahs. HALE's philosophic summary of the situation was that " it only showed how easily castles in Spain might be blown down." The positive result was just nothing; and yet a discouragement shared undoubtedly helped to carry enthusiasm through to the years of success.

In the spring of 1919, BREASTED, quite on his own initiative, sent to Mr. JOHN D. ROCKEFELLER, Jr. a letter outlining a plan for systematic research in the ancient world. Mr. ROCKEFELLER's reply brought the first of those generous gifts which culminated ten years later in the endowment of the Oriental Institute by the General Education Board. Mr. ROCKEFELLER's interest, and later that of the Board, grew as BREASTED's work in the Near East began to yield rich results, but the need was always just ahead of the funds available, and until the Institute was assured matters were at no time easy.

HALE was not wholly disassociated from the increasing success of these years. In his plans for the development of the National Academy he had provided for a series of lectures in memory of his father—the William Ellery Hale Foundation referred to in BREASTED's letter of April 9, 1914. The series began at the annual meeting of the Academy in that year with the constitution of matter, by Sir ERNEST RUTHERFORD, continued with stellar evolution, geologic transformation, the development of living forms —all by men of distinction, and ended with two brilliant lectures by BREASTED in 1919 on the development of civilization and its transition to Europe.

The evolutionary trend chosen by HALE as the general subject for the series provided an opportunity for BREASTED to step forth from the special field of Egyptology and set all the ancient civilizations in their proper place in the course of history. It was a formal statement of the principle that later guided the work of the Oriental Institute, and, as BREASTED had said in his letter written five years earlier, filled out the later portion of HALE's program.

To appreciate the situation, it must be understood that through all this period BREASTED felt a sense of isolation from his American colleagues, who were engaged in highly specialized studies and had little interest in what to him seemed the real problem—" a comprehensive synthesis of the whole process that carried man from savagery to civilization." The warm reception given to the Academy lectures was therefore welcome recognition.

While at Luxor during the early weeks of 1923 HALE wrote for *Scribner's Magazine* (12) his article " Recent Discoveries in Egypt," and, a little later, " The Work of an American Orientalist." Public interest aroused by the discovery of the tomb of TUTENKHAMON was at its height. These articles were widely read and of considerable influence in furthering the cause of Egyptian exploration. In a letter of December 8, 1923, BREASTED, referring to the account of his own work, says :

I hear the highest praise of the article from all sides. It is commended for many good things, but especially among others because it is not in the least fulsome or overdone. It has appeared at a time when it is immensely valuable to the cause I

(12) Vol. 74, pp. 34, 392 (July, October), 1923.

am trying to put through, and again I want to say that the gratitude I feel is not easily expressed. It will always be a deep pleasure to me to feel that I have had your support at this time and that you have shared in these efforts of mine to place such research as we believe in on a permanent foundation.

And again nine days later :

I hope to write you another note on the ship, with an account of recent happenings in the future plans of the Oriental Institute. The chief reason for this letter is to tell you that your article in *Scribner's* was most timely and accomplished a great deal of good.

The Egyptian seasons of 1922 to 1925 were exciting days. In the midst of the events centered about the tomb of TUTENKHAMON, the director of the Service des Antiquités, in January 1923, suddenly announced a proposed change in the law prescribing the allocation of objects found by excavators. Enforcement of this change would have meant the end of excavations by foreign parties. Protests were filed by the concessionaires with their respective governments, and HALE, who was in Luxor at the time, was able to aid materially in setting diplomatic machinery in motion by cabling to the National Research Council, which had an official approach to the State Department. The American Minister in Cairo, acting under special instructions, succeeded in obtaining a year's respite in the application of the new regulations.

In the following season the situation was further complicated by the dispute between the Egyptian government and the heirs of Lord CARNARVON. Because of restrictive interference by the government, Mr. HOWARD CARTER had stopped work on the tomb in February 1924, whereupon the concession had been revoked. All investigations in Egypt were endangered. A cabled appeal to the National Research Council, signed by leading American and British archaeologists, was referred to HALE, then in Pasadena, who prepared a formal request which, with others from influential sources, was submitted to the State Department. Again acting under special instructions, the American Minister in Cairo, with the aid of BREASTED who had been called in as mediator in the tomb dispute, was able to effect an adjustment which finally restored the concession and permitted a continuation of work on the tomb. Action on the antiquities law was again deferred, but the situation was so threatening that the Metropolitan Museum of New York ceased its excavation work in Egypt, and matters were not finally

settled until considerably later. HALE also had a part in the diplomatic preliminaries of the project for a great museum at Cairo to be provided by Mr. JOHN D. ROCKEFELLER, Jr. BREASTED was the intermediary in the negotiations, which in their final stages were suddenly terminated by the refusal of the Egyptian government to sign a contract whose provisions they had previously accepted and, in part, had actually dictated. HALE's recognized eminence in the scientific world and the fact that he had no personal interest at stake in any of these questions at issue made his support peculiarly effective.

VII

The foregoing account of HALE's activities needs but little to complete a portrait of the man. His accomplishment was so extraordinary that the bare statement of what he did and how he did it reveals much of his character. But since his personal investigations have scarcely been mentioned in these pages, it is important to add that what he liked best to do was research in his own field of the sun. At heart he was an investigator pure and simple. The organizations that he set on foot with such effectiveness gave him satisfaction, and in bringing them about he displayed all his characteristic enthusiasm; but they were only means to an end. Realizing his own ability, he undertook such tasks as an obligation, not as an occupation of primary interest. In a letter to BREASTED, who was faced with similar tasks, he said (May 26, 1925) :

> The true investigator in science, if he is worthy of the name, must try to shape his life's work so as to secure the greatest possible accomplishment, even if it means a sacrifice of his own possibilities of personal research.

Then, after referring to the attack on fundamental problems in astronomy through the active cooperation of specialists brought together in institutions that he had organized, he remarks :

> The results are already infinitely more valuable than anything I could possibly have obtained by individual research.

The significance of personal relationships in HALE's career has already been mentioned. Nowhere was the personal factor

stronger than in the intimate daily life of the Observatory. There his relation with the men about him was one of infective enthusiasm, springing from the mutual recognition of something which, accomplished, would bring estimable advantages and enduring satisfactions. And yet there was about it something more substantial than enthusiasm; the start invariably was from a solid structure of reason.

HALE's approach to something new was always logical. With him, however, the logical element somehow lost its stiffness. Part of it was a Gallic clarity of statement, which delighted because it resolved complicated matters into such simple elements. Then, too, an aesthetic factor was involved; the logical formulation was shaped by the imaginative powers of a temperament essentially artistic. Problems thus presented became something engaging, to be undertaken as adventures of the spirit; and to HALE they were indeed such adventures, entered upon with a kind of joyous gaiety. It was therefore only natural that he should always have been eager to be on the way. Once a decision was taken, let something be done; ignore obstacles, make a beginning, in the faith that difficulties would disappear. Occasionally he expressed his philosophy of action by the line :

> The gods bring threads to a web begun.

The refreshing quality of such an atmosphere of eagerness will not be forgotten by those who knew him. To see the threads weave themselves into a pattern was an inspiring example of what may be attained by confident action.

The strong initiative may have been HALE's; but somehow the responsibility quickly shifted, at least to the extent that it was shared. The man of experience was on his own; the younger man, needing guidance, found himself in a stimulating partnership, with his own aptitudes engaged to the utmost. Much may be accomplished by ignoring a man's incapacities and taking hold on the positive elements of his training and character. Probably HALE never consciously put the matter in this way; more likely it is only an example of his direct approach to an end, accepted instinctively. To pass it by, however, as merely an efficient utilization of human resources would be to disregard the reaction induced in those who worked with HALE. The collaborator,

doing always something within his powers, was assured of success; and who does not know the satisfaction of accomplishment, especially when generously recognized. Genuine appreciation of individual effort never failed; and besides, there was always a matter-of-course acceptance of the collaborator as one of a group working for a common end, whose personal part was indispensable in gaining that end. Even humble contributions were thus given dignity and worth. When recognition came to HALE for distinguished achievement, he insisted that award should have included those associated with him. If it came as a money prize, he found ways of sharing it, as in the gift of the fine portraits of YOUNG and FARADAY that hang on the Observatory's walls.

Generosity is an endearing human trait which injects a strong personal element into the relationships of men. Accompanied by HALE's friendly simplicity, his interest and sympathy, his unfailing consideration, it made the association of the director and those directed something unusual. A peculiar quality of that association was reflected in a feature of the Observatory's organization which persists today. The routine administration was carefully planned and for the problems of science there was endless thought; but the activity and conduct of the individual were his own affair. Under such conditions questions of loyalty and solidarity never arose; these essentials for the success of an institution were already there.

The personal element, however, went even deeper than these details suggest, because in the background were other human qualities which do not often enter into professional relationships. No individual escapes the difficulties and perplexities of life; and in a considerable group of people misfortune in some guise was usually at hand. Then was HALE always there, finding ways of helpfulness.

Carnegie Institution of Washington,
Mount Wilson Observatory,
July 1938.

FREDERICK H. SEARES.

Dr O. Uplavici (1887-1938)

To students of the literature dealing with amoebic dysentery the name of O. UPLAVICI is probably not unfamiliar : but few authors are aware, apparently, of his singular story, so the following lines recording his life and death may therefore be acceptable to readers of *Isis*.

That his life was singular there can be no doubt : it is probably unique in the history of science. For Dr UPLAVICI, though a pure Czech, had a Greek father and a German mother. He was born in 1887, published his only paper in the same year, obtained his doctor's degree later in the United States, and now—after a chequered career in many countries—breathes his last, as I write, in England.

I first became personally acquainted with Dr UPLAVICI when I was writing my monograph on *The Amoebae Living in Man* (1919) about 20 years ago. Before then I knew of his doings only by hearsay. I tried, at the time, to assign him to his proper place in my bibliography, but was prevented by the inaccessibility of his writings, my own ignorance of the Bohemian language, and typographical difficulties—my printers being unable to cope adequately with the Czech alphabet. Unfortunately my words—admittedly incomplete and unsatisfactory—have since been misunderstood and wrongly copied or interpreted by others, so I shall now attempt to set matters right. The true story is as follows :

In *Časopis lékařův českých* [=*Journal of the Czech Physicians*] of Prague, Annual vol. 26, No. 5, 29 January 1887, a paper was published by the late Dr JAROSLAV HLAVA. In this he recorded *inter alia* that he had discovered amoebae in the stools and intestinal ulcers of patients suffering from dysentery. The discovery was not new, as similar observations had been made previously by LÖSCH, KOCH, KARTULIS, and others. But HLAVA also reported that he had succeeded in causing dysentery in cats by intrarectal

inoculation of dysenteric stools—presumably containing amoebae, though this is not clearly stated—from human beings. (He obtained 4 positive results out of 6 attempts.) It thus appears probable that these were the first experiments in which ***Entamoeba histolytica*** was transmitted from man to the cat : and as cats, or kittens, have since been used extensively for the experimental study of amoebic dysentery, HLAVA's original observations have a definite historic interest and importance.

JAROSLAV HLAVA (1855-1924) was, among other things, Professor of Pathological Anatomy at Prague. He was a distinguished man, and for many years the *doyen* of the Czech medical profession. His career is briefly chronicled in obituary notices which appeared in 1924 in the *Bull. Acad. Méd.* (3 sér. **92**, 1200) and *J. Amer. Med. Ass.* (**83**, 2033). At all events, his name is not unknown, and his achievements inspire respect.

I have hitherto been unable to find any volumes of the *Journal of the Czech Physicians* (Prague) in London or elsewhere, and the *World List of Scientific Periodicals* shows no location in any library in Britain. But after long and fruitless search for HLAVA's original paper I finally obtained (in 1924) a complete typewritten copy from Dr J. DRBOHLAV (Prague); while another Czech friend, Dr F. ŠIMER (Bratislava), afterwards very kindly translated the whole of it into English for me. To both of these colleagues I am deeply indebted for this indispensable help in composing the present little biography.

HLAVA's paper of 1887 was written wholly in the Czech (Bohemian) language and was entitled " O úplavici. Předběžné sdělení " [= On dysentery. Preliminary communication]. So far as I have been able to ascertain, no translation or further communication in any language was ever published; and the original note is known to most workers solely through a brief review signed by the late Dr S. KARTULIS of Alexandria. This review, or abstract, was published in German in the *Centralblatt für Bacteriologie und Parasitenkunde* (as it was then entitled), vol. 1, p. 537; 1887. But by some extraordinary mistake the author's name (HLAVA) was there entirely omitted, and the title of his paper (O úplavici = On dysentery) was given in its place as " Uplavici, O." In this strange manner a new worker, O. Uplavici of Prague, made his first appearance in the literature of amoebic dysentery.

KARTULIS's abstract of HLAVA's paper certainly deserves to be called " strange." It appears under the author's name of " Uplavici, O.", and the name of HLAVA —its real author—is never mentioned throughout. Indeed, KARTULIS refers to him personally as " Uplavici," and even speaks of his own correspondence with a man of this peculiar name. It seems curious that anyone, sufficiently acquainted with the Czech language to be able to review a paper written in it, could confuse the author with the title of his work; and the position becomes still more remarkable when one examines the indexes of the *Centralblatt* (vol. 1). In the contents to the number (N° 18) in which HLAVA's paper is abstracted, his name is given again as " UPLAVICI, O." (p. 552) : but in the subject-index to the volume (p. 775) it appears as " HLAVA, UPLAVICI," while in the author-index at the end (p. 784) " HLAVA " is the only entry—" UPLAVICI " vanishing completely, without any explanation.

This situation has naturally led to much confusion in the literature of amoebiasis, and to the attribution of HLAVA's " Preliminary communication " to various authors. It is sometimes correctly referred to HLAVA himself (though without initial or other qualification) : to " O. HLAVA " (instead of J. HLAVA) : to " HLAVA, UPLAVICI " (as though UPLAVICI were HLAVA's forename); and to " O. HLAVA (O. UPLAVICI)," as though the two names were synonyms. In a recent paper *both* HLAVA and UPLAVICI are mentioned—as two different workers who studied dysentery in cats in early days. For these and similar errors there is good excuse; so it would be unfair, perhaps, to cite particular authors in illustration of mistakes which have been committed somewhat generally.

I must mention specifically, however, the well-known *Index-Catalogue of Medical and Veterinary Zoology* compiled by STILES and HASSALL (Washington), for it was here that UPLAVICI received his degree. In this publication HLAVA's paper is first indexed—though the single entry is incomplete—under his proper name (but with the wrong initial " O.", presumably borrowed from UPLAVICI) in Part 10 (1905). But in Part 31 (1910) the same paper (5 entries) is also assigned—without any explanation—to " UPLAVICI, O.", and the name is followed by the further information " Dr. " [in square brackets]. Where and how the authors of the

Index-Catalogue learnt of his medical qualification are riddles to which I have no clue.

For fifty years the mysterious " Dr O. UPLAVICI " has now haunted respectable books and periodicals—in Europe, America, and even the Far East—in a most disconcerting and undesirable manner, and it thus seems high time that his ghost should be laid once and for all. I therefore hope that all future writers on amoebae and amoebic dysentery will eliminate his name finally from their bibliographies, and bear in mind that he never had any real existence. JAROSLAV HLAVA's paper of 1887 was written by himself, and " O úplavici " [= On dysentery] was its title : and there can surely be no justification for allowing the title—even with appropriate alteration in order to personify it—to usurp the authorship. As I announced at the beginning, " Dr O. UPLAVICI " is dead; and I can only add fervently " ***requiescat in pace.***"

(National Institute for Medical Research, London) CLIFFORD DOBELL.

Editorial note.—This obituary was first published in *Parasitology*, the journal founded by G. H. F. NUTTALL and edited by D. KEILIN, vol. 30, p. 239-41, July 1938. Thanks to the courtesy of the author, of the editor and of the Cambridge University Press we are able to reproduce it in *Isis*. We desired to do so, in spite of the fact that as a rule *Isis* publishes only original papers, for pedagogical reasons. Dr. UPLAVICI is not the only ghost in scientific literature, but Dr. DOBELL has told his story so effectively that it will serve as a much needed warning. Remember Dr. UPLAVICI !

This note had been written for some time when I recalled other ghosts, already referred to in *Isis* (vol. 28, 269, 290). A dishonest contributor (or more than one) to the hastily compiled *Appleton's Cyclopaedia of American Biography* (6 vols., New York 1886-9) found it easier to invent biographies than to compile facts relative to known individuals, and thus introduced deliberately not one ghost but a regiment of them in that work. It is a pity that the rascal who perpetrated those evil deeds cannot be named. The disgrace must then fall upon the general editors JAMES GRANT WILSON and JOHN FISKE and the managing editor, ROSSITER JOHNSON, though extenuating circumstances may be urged in their behalf.

The first to discover those crimes was JOHN HENDLEY BARNHART, who published them under the title " Some fictitious botanists " (*Journal of the New York Botanical Garden* 20, Sept. 1919, 171-181). " In this he reprinted, with comments, fourteen biographical sketches of botanists, which, he was convinced, were entirely fictitious. According to accounts in the *Cyclopaedia*, the subjects of these sketches, with one exception, were Europeans who had come to the New World to study the botany of Latin America. The one exception was born in the West Indies but later settled in France. Although several of them visited the United States, none

remained very long, and not one of the sixty-nine works which they are said to have written deals with territory which was a part of the United States when the book in question was written. Most of them lived in the eighteenth century or earlier, although a few lived on into the nineteenth century."

Further investigations were made and thus far 47 fictitious biographies have been discovered, with the almost certain belief that there are considerably more, as only two letters H, and V, have been systematically studied. See the article of MARGARET CASTLE SCHINDLER (of Goucher College, Baltimore, Maryland) : " Fictitious biography " (*American historical review* 42, 680-90, 1937). Says Miss SCHINDLER : " The writer (or writers) of these articles must have had some scientific training, for most of the creations are scientists, and sufficient linguistic knowledge to have invented or adapted titles in six languages. He was certainly familiar with the geography and history of Latin America. Most of the places visited by his characters are real places, and most of the historical events in which they participated are genuine. However, he sometimes made mistakes by which his fraudulent work can be detected."

Beware of the *Appleton's Cyclopaedia* ! G. S.

A note on Hyoscyamus luteus

In JEROME E. BROOKS' admirable monograph on tobacco (*Tobacco*, New York, 1937, Vol. 1, p. 213) (1), a plant described by REMBERT DODOENS under the name of *Hyoscyamus luteus* is identified as the modern *Nicotiana rustica*. If this is correct. then DODOENS was the first writer to describe this species of tobacco. In this note I wish to review the evidence in favour of this identification.

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DIOSKORIDES mentions in his *Materia medica* a species of henbane called *ὑοσκύαμος μηλοειδής (Hyoscyamus luteus)*. It is not known what plant DIOSKORIDES intended to describe, though some modern commentators have suggested *Hyoscyamus aureus* (2). As a result the earlier herbals of the sixteenth century usually repeat DIOSKORIDES' meagre description of this plant without comment.

It is therefore surprising to find that REMBERT DODOENS, in his herbal *Cruydeboeck* (Antwerp 1554, p. 481), describes this plant at considerable length, and illustrates it with a figure (Fig. 1). DODOENS does not indeed say that this was a new plant, but there is abundant evidence to show that it was certainly new to other botanists of the time. LUIGI ANGUILLARA explicitly states that the *Hyoscyamus luteus* of DIOSKORIDES was unknown, and that he himself was unacquainted with the plant described by DODOENS under that name (3). MATTHIOLUS, in a later edition of his

(1) Reviewed by GEORGE SARTON, *Isis* 29, 186-188 (1938).

(2) J. SIBTHORP & J. LINDLEY, *Flora Graeca*, London, 1806-40, Vol. 3, p. 25. Also R. T. GUNTHER, *The Greek Herbal of Dioscorides*, Oxford 1934, p. 672.

(3) *Semplici dell'eccellente* M. LUIGI ANGUILLARA, Venice, 1561, pp. 268-69. " Hiosciamo. Non si conoscono a nostri tempi piu specie di Hiosciamo che due... Altri Hiosciami oltre questi non conosco, che corrispondano al detto di Dioscoride.

herbal (1565), probably refers to DODOENS when he says that some have described a certain new plant brought into Italy as a species of henbane. (4)

FIG. 1.

Moreover, there are several reasons for supposing that this *Hyoscyamus luteus* resembled *Nicotiana rustica*. Firstly, the

E ben vero, che'l Dodoneo ne ha posto uno, che pare che molto si confaccia a secondo di Dioscoride; pure sto sospeso."

(4) P. A. MATTHIOLI... *Commentarii in sex libros*, Venice, 1565, p. 1063. "Non desunt qui novam quandam in Italiam attulerunt plantam, spectatu sane pulcherrimam, quam inter Hyoscyami genera connumerant... Hanc iam pridem ex Italia ad me transmisit in Boemiam Iacobus Antonius Cortusus."

description and illustration correspond fairly well with *Nicotiana rustica*. (5) Secondly, CHARLES DE L'ÉCLUSE, discussing the tobacco plant in 1574, says that a smaller species, presumably *N. rustica*, had become known in Europe twenty years before, and had been described by DODOENS with the name *Hyoscyamus luteus*. (6) Thirdly, JOHN GERARD states in his *Herball* (London 1597, p. 1325) that Yellow Henbane, or *Hyoscyamus luteus*, is called by some " Petum, and Petun : of others Nicosiana, of NICOT a French man that brought the seedes from the Indies."

On the other hand, it is extraordinary that neither DODOENS nor MATTHIOLUS says that *Hyoscyamus luteus* was obtained from America. Almost certainly they would have mentioned this fact if they had known it.

Even more remarkable is a reference to *Hyoscyamus luteus* in GESNER's *De Hortis Germaniae* (1561). This quotation appears to have been overlooked : " Hyoscyamus albus & luteus, aestivae herbae, C[ordus] Fatetur autem se dubitare an vere Hyoscyami sint. Luteus quidem peregrina illa herba est, quam aliqui e Syria allatam aiunt, sapore acri : floribus Hyoscyami, luteis. Monspelii quidam Priapeiam vocant a forma fructus... Hyoscyami tertia species [i.e. luteus] Patavii in hortis seritur : semine, quod nuper misit amicus ad me, exili, subruffo et fusco, allato e Creta." (7) From this it appears that some believed *Hyoscyamus luteus* to come from Syria, and that GESNER obtained the seeds from Crete before 1561. It is difficult to suppose that this plant could be a species of tobacco.

It will also be noticed that, according to GESNER. this plant was sometimes called *Priapeia*. Now JACQUES GOHORY points out in his tract on tobacco (1572) that the " female " tobacco plant was regarded by some, not as a variety of tobacco, but as the " *Satyrion* "

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(5) See P. J. VAN MEERBEECK, *Recherches historiques et critiques sur la vie et les ouvrages de Rembert Dodoens*, Malines 1841, p. 317. Also P. J. D'AVOINE, *Éloge de* REMBERT DODOENS, Malines, 1850, p. 94.

(6) C. DE L'ECLUSE, *De simplicibus medicamentis ex Occidentale India delatis*, Antwerp 1574, p. 28. " Aliud eius genus, per omnia minus, folio rotundiore, nec hirsuto pinguive, licet succulento, flore minore, & per extremum rotundo, pallescente, ante viginti annos Europae innotuit, Dodon. Hyoscyamum luteum nuncupavit."

(7) C. GESNER, *De Hortis Germaniae* (affixed to the *Annotationes* of VALERIUS CORDUS), Strasbourg 1561, fol. 262 recto.

or "*Priapée*." (8) This may perhaps be the plant "Indicum satyrion," which GESNER had mentioned as early as 1541. (9) Unfortunately this plant has not been identified.

It is clear, however, that in the sixteenth century there was some confusion between *Nicotiana rustica* and another plant, not identified, which appears to have been introduced into Europe from Syria. Hence in the absence of any evidence to show that DODOENS' *Hyoscyamus luteus* was brought from America, it seems that its identification with *Nicotiana rustica* must be considered rather doubtful.

(London) R. E. OCKENDEN.

(8) J. GOHORY, *Instruction sur l'herbe Petum*, Paris 1572, fol. 5 verso. "Mais les aucteurs iugent n'estre la femelle de Petum ou Medicée, ains Satyrion ou Priapée, propre au tesmoignage de Juvenal à émouvoir la chaleur virile." For an account of GOHORY's tract, see W. H. BOWEN, *The earliest treatise on tobacco*, Isis 28, 349-63 (1938).

(9) C. GESNER, *Historia plantarum*, Basel 1541, p. 233. "Habent hodie & Syri herbam simili effectu, bucheidenque nominant, & Indicum satyrion, radice candida et dura, commendatiore quo crassior, rugiosior & albior fuerit, podagris utili."

Notes and Correspondence

Answer to Query no. 74. (*Isis*, 29, 98-99).—The mysterious arctic traveller of 1360. Nicholas of Lynn.

Dr. SARTON has called attention to the *Inventio fortunata*, a treatise on the polar regions known in the 16th century but not now to be found. (1) It was quoted by RUYSCH on his famous map of 1508 and mentioned by FERNANDO COLOMBO, *Historie di Cristoforo Colombo*, cap. IX, and LAS CASAS, *Historia de las Indias*, cap. XIII; but it is best known from the remarks of MERCATOR and JOHN DEE in HAKLUYT's *Principal Navigations* (ed. Glasgow 1903, I, 301-4). However, a much fuller form of HAKLUYT's material is found in DEE's unpublished work, *Famous and Rich Discoveries*, which is preserved in the British Museum, Cotton MS., Vitellius C. VII. Some account of this material is given by E. G. R. TAYLOR, *Tudor Geography* (1930), 133, and in lieu of the lost treatise a full publication of it would be welcome. MERCATOR and DEE discussed the *Inventio fortunata* at length and apparently made several combinations and deductions which it would be uncritical to accept without reviewing their evidence. They ascribed the treatise to a certain Franciscan from Oxford whose travels in Norway and beyond in the year 1360 were reported by one JACOB CNOYEN of Bois-le-Duc ('s Hertogen Bosch) in the Netherlands (cf. HAKLUYT, III, 281). They then identified this traveller with NICOLAS OF LYNN, a mathematician at Oxford in the late 14th century.

In HAKLUYT the treatise is described as *Inventio fortunata, qui liber incipit a* 54. *gradu usque ad polum*, but the Cotton manuscript gives the seventh climate instead of the 54th degree. Both terms are derived from classical geography. The seven climates of the habitable world were a prominent feature of ancient geographical lore (E. HONIGMANN, *Die Sieben Klimata*, 1929), and the seventh climate here signifies that the voyage began from the northern side of the temperate or habitable zone and traversed the whole of the frigid zone, which was supposed to be uninhabitable. The 54th degree is more exact but bears the same

(1) B. F. DE COSTA, "Arctic Exploration," *Journal of the Am. Geogr. Soc.* XII (1880), 159-192; R. HENNIG, *Terrae Incognitae* III (1938), 261-267. The *Inventio fortunata* is not listed in THORNDIKE and KIBRE, *Catalogue of Incipits of Mediaeval Scientific Writings in Latin* (1937).

significance. According to one system of ancient geography the zones from the equator to the pole were as follows : torrid 16800 stades (24°), temperate 21000 stades (30°), frigid 25200 stades (36°). The northern limit of the temperate zone was thus 54°. This system is found in GEMINUS, *Elementa Astronomiae*, cap. XVI, and MACROBIUS, *Comm. in Somnium Scipionis* II, 6. MACROBIUS' work was widely read during the Middle Ages. GEMINUS also was translated from Greek into Arabic and Latin at an early date. What connection existed between these works and the *Inventio fortunata* can be told only after the original text or DEE's abstract of it is published.

Indiana University. AUBREY DILLER.

XIth Congress of the International Association for the History of Medicine. *Medicinski Pregled*, 13:122-207, July, August, September, 1938.—The three 1938 summer issues of the Medicinski Pregled contain 29 articles by Yugoslavia writers dedicated to the participants of the XIth Congress of the International Association for the History of Medicine which met in Yugoslavia in September 1938. The contributions refer mostly to the history of medicine in the Balkan area. That there is a wholesome and growing interest in cultural affairs relating to science in the Near East is clear from these writings. An unfortunate circumstance attending the publication of these special numbers was the sudden death of the editor, Dr. R. A. PAVLOVLIC.

The scope of the articles is indicated by their titles : V. BAZALA : " Neuere Untersuchungen über den Schullehrer JOSIP LALIĆ und seine Behandlung der Hundswut, and " Les prêtres-médecins "; S. BOŠNJAKOVIĆ : " Geschichte und Volksbild einer endemischen Krankheit "; L. BROZOVIĆ : " Zigeuner als Aftertierärzte (Tiercurpfuscher) " and " Prof. Dr. JOSIP VON ZLATAROVIĆ "; M. BUDIMIR : " De carminis ' Sator arepo ' vi atque origine " and " De AESCULAPII nomine et numine "; V. ĆOROVIĆ : " Des hôpitaux en Serbie au Moyen Age "; V. ĆAJKANOVIĆ : " De diis et daemonibus Serborum medicis "; M. DRAGIĆ : " La médecine dans la poésie nationale des Slaves du Sud "; T. R. DORDEVIĆ : " LOKMAN le médecin dans la tradition nationale "; S. HOFFMANN : " Radiographische Darstellung einiger pathologischen Befunde an homo diluvialis Krapinensis (Gorjanović-Kramberger) "; S. Z. IVANIĆ : " La malaria dans la médecine populaire en Yougoslavie "; R. JEREMIĆ : " Brevis conspectus historiae culturae sanitariae in Jugoslavia "; M. KARLIN : " Valvasor und die Volksmedizin "; J. KÖRBLER : " Die Krebsbehandlung in der jugoslavischen Volksmedizin "; B. KONSTANTINOVIĆ : " Les premiers médecins tchécoslovaques en Serbie "; R. MARIĆ : " Des légendes des saints guérisseurs dans les biographies

anciennes serbes " and " La guérison miraculeuse du roi STEVAN DECANSKI dans la tradition populaire serbe "; P. MIJOVIĆ : " Expertises juridico-médicales dans la République de Dubrovnik "; J. MIJUŠKOVIĆ : " Décret sur la fondation d'un nouvel hôpital à Dubrovnik et les réparations à y effectuer accepté par le Sénat le 17 mars 1540 "; A. MIRKOVIĆ : " Court exposé sur le développement de la pharmacie en Yougoslavie "; U. S. RUŽIČIĆ : " Une loi du Moyen Age sur la portection des enfants abandonnés dans la République de Dubrovnik "; L. STANOJEVIĆ : " L'histoire de la lèpre dans les régions yougoslaves "; A. ŠEVIĆ : " Les chirurgiens populaires en Yougoslavie "; L. THALLER : " Le poivron rouge (paprika) comme remède contre le scorbut en 1864," " De la différence fondamentale entre les méthodes mystique et psychique du traitement médical " and " Comment est mort le Vrai VRONSKY "; K. TODOROVIĆ : " Die Contumazen-Quarantaenen in den jugoslavischen Ländern."

Fifth International Congress for the Unity of Science, Harvard University, September 5-10, 1939. Preliminary announcement.— The Fifth International Congress for the Unity of Science is to be held at Harvard University, September 5-10, 1939.

The theme of the Congress is *Logic of Science*, interest will center upon the relation of the concepts, laws, and methods of the various sciences. Attention will be devoted to general problems connected with the unification of science, and, in particular, with the logic of the physical sciences, the relation of the physical and biological sciences, and the relation of the biological and socio-humanistic sciences. There will also be a number of special sessions and symposia concerned with special problems and fields.

The International Organizing Committee is composed of R. CARNAP, P. FRANK, J. JOERGENSEN, C. W. MORRIS, O. NEURATH, H. REICHENBACH, L. ROUGIER, L. S. STEBBING. The American Organizing Committee contains E. T. BELL, P. W. BRIDGMAN, R. CARNAP, A. CHURCH, M. COHEN, J. DEWEY, H. FEIGL, L. J. HENDERSON, C. J. HERRICK, E. V. HUNTINGTON, H. S. JENNINGS, W. KÖHLER, S. K. LANGER, C. H. LANGFORD, K. S. LASHLEY, V. F. LENZEN, C. I. LEWIS, R. S. LILLIE, A. O. LOVEJOY, R. M. MACIVER, W. M. MALISOFF, W. P. MONTAGUE, C. W. MORRIS, E. NAGEL, F. S. C. NORTHROP, W. V. QUINE, H. REICHENBACH, E. SAPIR, G. SARTON, H. SCHULTZ, E. C. TOLMAN, W. WEAVER, L. WIRTH.

Professor P. W. BRIDGMAN is the Chairman, and Dr. W. V. QUINE is Secretary, of the Committee on Arrangements at Harvard University. The Congress is sponsored by the International Committee of the Congresses for the Unity of Science, the International Institute for

the Unity of Science, and, in America, by the American Association for the Advancement of Science, the Philosophy of Science Association, the Association for Symbolic Logic, and the American Philosophical Association.

A series of twenty monographs, entitled *Foundations of the Unity of Science* (and constituting the first two volumes of the *International Encyclopedia of Unified Science*) is now being issued by the University of Chicago Press, and helps to provide a background for the Congress. Three monographs have already appeared, and it is hoped that all twenty will be in print by the opening of the Congress.

Those requesting later notices of the Congress are asked to send their names and addresses to Professor CHARLES W. MORRIS, University of Chicago, Chicago, Illinois.

International Institute for the Unity of Science.—Executive committee : PHILIPP FRANK, CHARLES W. MORRIS, OTTO NEURATH. Headquarters : 267 Obrechtstraat, The Hague, Holland. Telegraphic address : Mundaneum, The Hague.

The activities of this group since its organization include : Initial conference in Prague, 1934 (report published in *Erkenntnis*). First international congress in Paris, 1935; special subject : Scientific philosophy (report published by HERMANN, Paris, in the series *Actualités scientifiques et industrielles*). Second international congress in Copenhagen, 1936; special subject : Causality (report published in *Erkenntnis*). Third international congress (Encyclopedia conference) in Paris, 1937 (report published in *Einheitswissenschaft*, *Unified science*, *Science unitaire*). Fourth international congress in Cambridge, England, 1938; special subject : Scientific language (report to be published in *Erkenntnis*). Fifth international congress in Cambridge, Mass., Sept. 1939; special subject : Logic of science. At this fifth congress the first two volumes of the *International Encyclopedia of Unified Science* (Foundations of the unity of science) will be ready.

Thus far two parts of vol. 1 of the *International Encyclopaedia of Unified Sciences* have been published and their rich contents are classified in the 55th Critical Bibliography of *Isis*. When vols. I and II are completely published, they will be reviewed.

The organizing Committee of the International Congress is composed at present (July 1938) of the following members : K. AJDUKIEWICZ (Lwow), N. BOHR (Copenhagen), M. BOLL (Paris), H. BONNET (Paris), P. W. BRIDGMAN (Cambridge, Mass.), E. BRUNSWIK (Berkeley), R. CARNAP (Chicago), E. CARTAN (Paris), J. CLAY (Amsterdam), M. R. COHEN (New York), J. DEWEY (New York), F. ENRIQUES (Rome), P. FRANK

(Prague), M. FRECHET (Paris), F. GONSETH (Zürich), J. HADAMARD (Paris), P. JANET (Paris), H. S. JENNINGS (Baltimore), J. JOERGENSEN (Copenhagen), E. KAILA (Helsingfors), H. KELSEN (Geneva), T. KOTARBINSKI (Warsaw), A. LALANDE (Paris), P. LANGEVIN (Paris), K. S. LASHLEY (Cambridge, Mass.), C. I. LEWIS (Cambridge, Mass.), J. LUKASIEWICZ (Warsaw), G. MANNOURY (Amsterdam), R. VON MISES (Istanbul), C. W. MORRIS (Chicago), O. NEURATH (The Hague), C. K. OGDEN (London), J. PERRIN (Paris), H. REICHENBACH (Istanbul), A. REY (Paris), C. RIST (Paris), L. ROUGIER (Besançon), B. RUSSELL (Kidlington), G. SARTON (Cambridge, Mass.), L. S. STEBBING (London), J. H. WOODGER (London).

International Astronomical Union. At its sixth general assembly, held at Stockholm, August 1938, commission 5 concerned with bibliography voted the following resolutions :

1. The commission recommends that the subvention to the " Bibliographie mensuelle " should be raised from £ 100 to £ 150.

2. The commission learns with pleasure that the Belgian national committee has provided means to make it possible for Dr. PELSENEER to take over and carry on the late Dr. STROOBANT's work for filling the gap between the HOUZEAU-LANCASTER bibliography and the *Jahresbericht*. The commission will be glad to help and support Dr. PELSENEER in his undertaking.

3. The commission recommends the use of the decimal system in the classification of astronomical literature.

4. The commission has appointed Professor VYSSOTSKY of the Leander McCormick Observatory to take necessary steps for a translation of the astronomical parts of the ancient Russian chronicles.

5. The commission asks the Observatory of Lund to work out a card record of astronomers and observatories.

6. The commission learns with pleasure that Dr. H. VON KLÜBER of the Potsdam Observatory plans to take up Ancient Egyptian astronomy for studies jointly with experts on Egyptology.

7. The commission has decided to work out a small list of subjects within the branch of historical astronomy. When this list is ready steps shall be taken for its circulation among scientists and men of letters.

8. The commission recommends that, jointly with the Royal Society of London, steps be taken to edit and publish the scientific letters of ISAAC NEWTON, if possible before 1942.

Un grande atlante di numeri primi depositato presso il Consiglio Nazionale delle Ricerche.—La R. Accademia d'Italia ha raccolto in un elegante manoscritto di 650 pagine che porta il titolo di

Atlante di altre 60,000 *numeri fra* 10 *milioni e tre miliardi* (*et ultra*) i risultati editi ed inediti delle vastissime calcolazioni eseguite in questi ultimi tempi dal noto studioso LUIGI POLETTI. L'opera concepita ed attuata con larga visione è veramente importante perchè riempie una lacuna nella letteratura matematica nella quale entra come ' primo modello ' di un atlante di numeri primi di ordine quadratico, illustrato da prospetti statistici. Esso rappresenta anche la più vasta rassegna di N. P. oggi esistente, oltre 10 milioni che è il limite rotondo raggiunto dalla *List of prime numbers*, testo ufficiale dei N. P. compilato in America da D. N. LEHMER ed eseguito a spese della ' Carnegie Institution of Washington (1914).' Mentre è da augurarsi che queste Tavole del POLETTI vengano pubblicate, la R. Accademia d'Italia ha pensato di depositare il Volume manoscritto presso il Consiglio Nazionale delle Ricerche ove rimarrà alla libera consultazione degli studiosi. (*Il Bollettino di matematica*, anno 34, p. LX, Sett. 1938).

Editorial board of Isis.—The very important department of " Greek science " has been intrusted to Professor AUBREY DILLER, already well known to our readers by his edition of " A geographical treatise by GEORGIUS GEMISTUS PLETHO " (*Isis* 27, 441-51, 1937) and by distinguished reviews. In order to introduce him more completely, here is a brief curriculum vitae :

Born in Nebraska in 1903, educated in local public schools. Degrees : A. B. 1925, A. M. 1927, Univ. of Nebraska; Ph. D. in Classics 1930, Univ. of Illinois. Positions : Teacher of Latin, High School, Stanton, Nebraska, 1925-26; Assistant in Classics, Univ. of Illinois, 1927-29, 1937; Fellow in Classics, Univ. of Illinois, 1929-30; Instructor of Latin and Greek, Univ. of Michigan, 1930-34; Research Fellow, American Council of Learned Societies, 1935-36; Instructor of Latin and Greek, Heidelberg College, Tiffin, Ohio, 1937-38; Assistant Professor of Greek, Indiana Univ., 1938. Travel and research in Europe, 1934-36. Publications : Race mixture among the Greeks before ALEXANDER, 1937; articles, chiefly on the classical Greek geographers.

I welcome him very heartily in the little Isidic community and hope we may work together for many years to come, and battle together for the cause of sound scholarship, for science and humanism. G. S.

Personalia.—(*News pertinent to this section should be sent directly to M.* L. GUINET, 11 *Place général Meiser, Brussels, Belgium.*)

Dr. T. L. DAVIS, associate editor of *Isis*, was appointed professor of organic chemistry at the Massachusetts Institute of Technology, Cambridge, Massachusetts, beginning with the academic year 1938-39.

Dr. ALDO MIELI, Permanent secretary of the International Academy of the History of Science, editor of *Archeion*, will celebrate on December 4, 1939, his sixtieth birthday. His Italian preface to vol. XXI of *Archeion* contains reminiscences of great interest for the study of his life and work. We send him our congratulations and best wishes.

Dr. HARVEY CUSHING, sometime president of the History of Science Society, was awarded an honorary degree of doctor of science by the University of Oxford. See the witty Latin citation and an account of the ceremonies in the *Lancet* vol. 235, 226, July 23, 1938).

WALDO GIFFORD LELAND.—At the Eighth International Congress of Historical Sciences which met at Zurich in the summer of 1938. Dr. LELAND, permanent secretary of the American Council of Learned Societies, was elected president of the International Committee of Historical sciences for the period 1938-43. The International Committee is the permanent body which continues the activities of the International Congress between the meetings ; its president is president of the congress occurring at the end of his term of service. The location of the Ninth Congress (1943) has not yet been decided.

Reviews

Martin Frobisher.—*The Three Voyages of Martin Frobisher.* Edited by VILHJALMUR STEFANSSON, with the collaboration of ELOISE MCCASKILL. In two volumes, CXXX+166, and VIII+293 pp., with numerous illustrations and maps. London : The Argonaut Press, 1938 (84/-).

The voyages of the great Elizabethan seamen are no longer looked upon as romantic examples of reckless adventure. Modern scholars, studying the records and accounts of these voyages for the light they throw upon the history of mercantilism, of anthropology, and of mathematical and geographical science, have increasingly revealed the practical motives that inspired the English navigators and the careful and systematic planning that preceded each of their ventures. As a result of the recent investigations of scholars such as J. A. WILLIAMSON, G. B. PARKS, E. G. R. TAYLOR, G. B. MANHART, and others, not to mention the earlier work of the editors of the Hakluyt Society volumes, we are now in no danger of underestimating the roles of the less conspicuous contributors to the voyages of exploration. The zealous propagandists for colonial and mercantile expansion who aroused public interest, the merchants and noblemen who backed the ventures and subscribed to stock in the companies, the diplomatic and commercial agents who systematically gathered information and transmitted it to England for use in preparing the instructions for the voyagers, the scientists who were called upon to contribute their expert knowledge and to instruct the commanders in methods of taking observations and recording data that would prove useful in furthering scientific progress—all these men lay behind the man of action who captained the vessels that set forth for distant seas.

For illustrating the co-operation of the merchant promoter, the speculative investor, the scientist, and the experienced sea captain in organizing and equipping a maritime expedition, no better example could be found than the three voyages of MARTIN FROBISHER in search of the North-West Passage, made in the years 1576, '77, and '78. Of no Elizabethan ventures, moreover, do we have more detailed and varied records. Particularly welcome, therefore, are the present volumes, in which all the important material concerning these voyages is reprinted, together

with an introduction and notes by one of the most distinguished of living Arctic explorers and scholars, Dr. VILHJALMUR STEFANSSON. The story that emerges from their pages is not one of mere adventure, but of commercial and, above all, of scientific enterprise. We see, on the one hand, the methods by which these voyages were promoted and capital raised to finance them (incidentally, the FROBISHER records provide the fullest data on the organization of early joint-stock companies). On the other hand, we perceive that, notwithstanding the important roles of FROBISHER himself and of the London merchant MICHAEL LOK, an equally important role was played by JOHN DEE, the most learned English scientist of the day. Under DEE's direction the officers were trained in astronomy and the use of the latest navigating instruments. More than this, DEE had studied and compared the existing maps of the northern regions, and had ransacked the available manuscripts and books for information concerning the seas and lands to which FROBISHER was to sail. Thus, through the combined efforts of DEE, LOK, and their friends, FROBISHER's expedition set forth knowing everything that could be learned about the regions lying to the west and north, between England and their destination, Cathay. Because DEE realized the inadequacy of the information obtainable and the difficulty of reconciling conflicting accounts, the expedition received careful instructions for gathering and recording needed data, so as to increase Europe's scientific knowledge of the geography, the inhabitants, and the resources of the lands they were to visit.

This picture of the organization of a carefully planned scientific enterprise is by no means a new one to scholars who have studied the contemporary accounts and records. Never before, however, has so large a mass of these documents been assembled within the covers of a single work for the benefit of the general reader. These volumes amplify and bring down to date the splendid collection of FROBISHER materials in Admiral RICHARD COLLINSON's edition of *The Three Voyages of Martin Frobisher* published in 1867 by the Hakluyt Society. Besides reprinting everything of importance in COLLINSON's edition, they include—in addition to Dr. STEFANSSON's 130-page introduction which will be discussed later—several other contemporary accounts found in sixteenth-century books and in HAKLUYT's *Principall Navigations* but not reprinted by COLLINSON, and a number of valuable appendixes. The first of these appendixes reprints from the *Huntington Library Bulletin* the report of the hitherto missing portion of LOK's accounts of the third voyage which was recently discovered by Professor GEORGE B. PARKS among the Huntington Library's manuscripts. Others contain FROBISHER's will, bibliographical notes by the editors, and summaries of studies by various

scholars of certain special problems, such as the Eskimo words reported by the voyagers, the mystery of the disposition of the FROBISHER relics found in 1862 by CHARLES FRANCIS HALL, and the nature of the ore brought back to England by FROBISHER.

The place of honor, both in COLLINSON's edition and in the present one, is given to GEORGE BEST's *A True Discourse of the late voyages of discouerie* (London : Henry Bynnyman, 1578), the most complete account of FROBISHER's voyages by one who participated in them. BEST was FROBISHER's lieutenant on the second and third voyages. In his treatise the first-hand chronicle of the last two voyages is preceded by a first book, which, although summarizing at the end the events of the first voyage, deals for the most part with the spirit of the age which inspired men with a boundless confidence in future scientific and material progress, with the existing geographical knowledge of the world and the part played by Englishmen in its recent augmentation, and concludes with soundly reasoned scientific arguments, supported by the actual experiences of travelers, to disprove the popular belief that the tropic and arctic zones had climates unfit for human habitation.

The introductory section of BEST's book should be known to all students of the Elizabethan age. Though typical of the times, it is unsurpassed as an illustration of the forward-looking scientific spirit of the 1570's, and emphatically refutes the misconceptions that still persist concerning the attitude toward ancient authority and toward the practical value of science which was current in England before the time of FRANCIS BACON. BEST begins his treatise with a brief summary of the progress of various arts and sciences from ancient times to the present, and proceeds :

> And many others in sundry faculties & sciences, have both heretofore, and especially now in these later dayes, do so bestow and employ their time, that rightly they may be sayd to have deserved the name of profitable members of the common wealth : so that now by continuall practise, and the exercising of good wittes, the world is waxed finer, and growen to more perfection, not only in all the speculative Artes and Sciences, but also in the practicall application of the same, to Mans use, whereof as the one doth exceedingly delighte the inward mind, in seeing the sequele of things by arte and reason, so the other in the Mecanicall and practicall application (whiche of late yeares, more than ever heeretofore hath bin used) dothe so pleasure and profite the world, that this time only may rightely bee called the liberall and flourishing age.... And the chiefest cause of all these effects (next after ye divine Providence) is the searching wit of man, whiche being more curious and inquisitive of new and strange devises, than heeretofore, bringeth out dayly more strange inventions, and causeth others, through emulation, to do the like, not onely in providing ye necessary things aforesaid, but also a continual care & constancie to find out other new Arts occupations & faculties.

BEST continues this glorification of science, with its enthusiastic profes-

sion of faith in material progress, by bringing forward examples of modern inventions and discoveries, giving special mention to printing, the compass, and the improvements in navigation leading to the finding out of new regions of the world.

Of special interest, also, is Dr. STEFANSSON's note to BEST's long discourse refuting the prevailing notions concerning the climates of the torrid and arctic zones. STEFANSSON remarks that in his book, *The Northward Course of Empire* (1922), written before he had read the accounts of the English voyages, he had felt the need of combatting many of the same views on arctic climate, still current in the twentieth century, and had done so by almost the same means as BEST had used. To his surprise, most of the reviews (apart from those in technical journals) found " novel and enlightening or else strange and incredible that part of the work which parallels Best." In eradicating popular errors, we seem to be still fighting, not too successfully, the battle waged so vigorously by sixteenth-century writers on geography.

In the other accounts of FROBISHER's voyages we find the same scientific spirit that permeates BEST's book. FROBISHER's men, when they saw sights that were strange to them, were not driven by superstitious awe to imagine miraculous causes for the phenomena. Instead, they habitually sought rational explanations, based upon the scientific knowledge at their command.

Consideration of the admirable introduction, written by Dr. VILHJALMUR STEFANSSON with the collaboration of ELOISE MCCASKILL, has been reserved to the last. It is this introduction and the accompanying notes that give these volumes a scholarly distinction to which a mere collection of scattered materials could never aspire. Making use of all that recent scholarship has revealed concerning Europe's contact with the northern section of the New World from the first discovery of Iceland to the time of FROBISHER's voyages, the editor presents a masterly summary of the early history of the discovery and colonization of northeastern North America. No one is better fitted than Dr. STEFANSSON to analyze and interpret the evidence amassed through the efforts of Scandanavian, English, and American scholars. His long first-hand experience with the realities of arctic travel and his familiarity with Eskimo life give authority to the astute inferences he often makes from apparently trivial facts whose significance might not be apprehended by scholars lacking his special qualifications.

The story told in this introduction may well astonish readers unacquainted with the early Norse explorations and the history of Greenland during the middle ages. Dr. STEFANSSON begins with the striking statement : " The New World was discovered by whoever discovered Iceland.

For to reach Iceland you must cross a wide and stormy ocean far out of sight of land, while thereafter you can see westward from island to island till the mainland of North America rises above your horizon." Regarding the first discovery of Iceland, we have vague early reports in the eighth century and clear references by DICUIL in 825 to show that the Irish monks were acquainted with Iceland and had made journeys thither long before the period of Norse colonization began in the latter half of the ninth century. The settlement of Greenland started a century later, in 981, under the leadership of ERIC THE RED, who had been exiled from the Icelandic republic. By 990 Greenland had established a republic on the Icelandic model. In the year 1000, LEIF, the son of ERIC, while making a direct voyage from Norway to Greenland, overshot Cape Farewell and landed on the mainland of North America. Three years later THORFINN KARLSEFNI, starting from Greenland, headed an expedition that explored the eastern coast of the mainland. Thereafter, so long as the Greenland colony flourished, traffic doubtless continued between the Norsemen and the natives of the Baffin Island-Labrador district, a surmise that is confirmed, Dr. STEFANSSON believes, by actions of the Eskimos upon the arrival of FROBISHER, which indicated that fair-skinned visitors in ships were not unfamiliar to the natives.

The Greenland colony, furthermore, was widely known to the Europe of the middle ages, both through the trade in such highly prized commodities as falcons and polar bears and through the Church, which maintained a regular succession of bishops of Greenland from 1124 onwards and was constantly reminded of the existence of this distant land because of the persistent difficulty of collecting tithes. On the fifteenth-century maps, and notably in the 1482 Ulm edition of PTOLEMEY's *Geography*, Greenland was located with reasonable accuracy. After the direct traffic between Norway and Greenland had declined in the fourteenth and fifteenth centuries, a fairly extensive though largely unrecorded trade sprang up between Bristol and northeastern North America and continued into the sixteenth century.

Throughout his discussion, Dr. STEFANSSON emphasizes the continuity of the relations between Europe and Greenland. Written sailing directions existed long before COLUMBUS, and there was probably a still more intimate continuity in the verbal transmission of data by the Norse, and later by the Bristol, pilots. It is suggested, moreover, that the view that COLUMBUS himself made a voyage to Iceland before 1492 is at least worthy of a respectful hearing.

There was, in short, no gap between the trading voyages to these regions before CABOT and those that followed. In view of these facts, the mystery of the disappearance of the Greenland colony becomes the more puzzling.

Dr. STEFANSSON is in accord with his fellow-explorer NANSEN in rejecting the theory that the decline of the colony was due to malnutrition resulting from lack of imported cereals and to attacks on the weakened population by the Eskimos. Instead he maintains that the colonists did not become extinct, but were amalgamated with the Eskimos, whose ways of life were better adapted to the country. He ably supports this contention by evidence from the accounts of FROBISHER's and other expeditions and from modern archaeological discoveries.

From this introduction, then, we get a fresh insight to the early history of Europe's contact with the New World, and learn that a knowledge of the geography of the northern regions was continuously available to well-informed people from the twelfth century onwards. FROBISHER's enterprises thus take their place in a long and uninterrupted line of European voyages to Iceland, Greenland, and the adjacent mainland, which dated back to the tenth century. Of this the Elizabethans were not unaware, though we of today need often to be reminded that Europe, long before COLUMBUS, knew of the existence of lands to the westward, across the Atlantic ocean.

Worthy of the value of their contents is the format of these handsome volumes. Magnificently printed and bound, they exhibit that concern for the details of fine bookmaking which is characteristic of the publications of the Argonaut Press, and are a fitting memorial to those courageous seamen, explorers, merchants, and scientists who had a hand in advancing Europe's knowledge of the lands across the sea.

Stanford University. FRANCIS R. JOHNSON.

Warren R. Dawson, editor.—*Sir Grafton Elliot Smith.* (1871-1937). A biographical record by his colleagues. 272 p., [5] pls. London, JONATHAN CAPE, 1938. Price 12/6 net.

This is a collaborative work of nine authors, a fact indicative of the extraordinarily diversified interests of this versatile scholar whose researches were distributed among the fields of neurology, comparative anatomy, human anatomy, physical anthropology, ethnology, Egyptology, diffusion of culture, and human evolution. It contains from the pen of the editor a general biography founded in part on a correspondence gathered from a few of ELLIOT SMITH's scientific friends. This is followed by an incomplete autobiography started, but never finished, in months of invalidism, by this great anatomist. Professor T. J. WILSON of Sydney and Cambridge Universities writes of his early career. As a schoolboy and university student he was from the first recognized as a lad of exceptional intellectual qualities, with natural gifts as a musician and an artist,

qualifications which are akin to his later interest in the science of morphology. His doctor's thesis dealt with the finer structure of the cerebrum of a marsupial and led on to his brilliant career in neurology. Lord RUTHERFORD, a fellow student of SMITH in Cambridge days writes of the influence of Colonials on the University in widening its interests. Professor F. WOOD JONES describes the busy and fruitful days in Egypt and Nubia where SMITH, starting with the brains of mummies, rapidly widened his interests to mummification, physical anthropology, and ethnology. Professor J. S. B. STOPFORD gives an account of the Manchester period during which SMITH elaborated his evolution of the cerebral cortex, his *History of Mummification*, *Migrations of Early Culture*, and his analysis of the Piltdown Skull. Professor H. A. HARRIS writes of his career at University College where the gift of the Rockefeller Foundation made possible great expansion of the work in the Medical School and the appointment of SMITH to the chair of Anatomy. In his hands it rapidly assumed the broader outlook of an institute of human biology. Here between 1919 and 1934 appeared his *Significance of the Cerebral Cortex; Essays on the Evolution of Man; Sympathetic System; New Vision; Rhodesian Man*, *Nebraska Man*, and *Peking Man; Elephants and Ethnologists; Migrations of Early Culture* (Ed. 2); and *Diffusion of Culture*. Dr. A. J. E. CAVE writes a discriminating analysis of SMITH's work as a master anatomist in which his neurological investigations were woven into a unified whole. One looks in vain in this for a comparison of his work with that of ECONOMO and some others. The closing chapter by Dr. W. J. PERRY summarizes SMITH's work as anthropologist and ethnologist, in both of which fields his concept of the diffusion of culture from Egypt as a center based in part on mummification and megalithic monuments ran afoul of the concept of independent origins arising from psychic unity. This gave rise to spirited controversies which were a cause of rejoicing rather than chagrin since they sometimes resulted in clarification of views.

There is a bibliography of 454 titles which exhibits the productivity and versatility of this great anatomist.

ELLIOT SMITH was fortunate in beginning his work in Australia, the continent of primitive mammals, and in concerning himself early in his career as a neurologist with the "smell-brain" stage in the evolution of the mammalian brain. These experiences seem to have given to all of his later activities a decidedly evolutionary tendency.

Even more influential in this direction was his own inherent intellectual flare for synthesis and generalization and his keen nose for scenting out significant trails amidst the mazes of neurological and anatomical data and for detecting obscure correlations among facts in widely diverse intellectual disciplines and fields of investigation. This generalizing

habit of mind undoubtedly was an outgrowth of his morphological training and the intellectual pattern which the skillful use of this method inculcates. In no phase of his intellectual life is this more apparent than in the sequence of activities which culminated in his exposition of the diffusion of culture from Egypt as a center across Asia and Oceania to early American civilizations. Starting with a shift from olfactory to visual senses in the functional and structural evolution of the vertebrate central nervous system he was carried on through the widening fields of cerebral evolution, physical anthropology, Egyptology, and ethnology, to the cultural evolution of the human race.

The intellectual patterns of PASTEUR and ELLIOT SMITH have much in common. Each followed a logical course of development of ideas, each exhibited a keen strategy of following intellectual clues consistently and persistently into ever widening fields of scientific interest, each met with vigorous and vocal opposition from specialists, especially those long schooled in the restricted disciplines which he invaded, and each attracted a school of ardent disciples. The scientific career of each affords an instructive pattern in the history and method of science.

The career of SMITH differed from that of the French savant in the important particular that PASTEUR employed the experimental method to check his hypothesis whereas the English anatomist, perhaps by temperament but certainly in part by reason of the very nature of his subject matter was excluded from using this method. This difference is seen most acutely in the anatomist's approach to the problem of cerebral localization. He did not develop an experimental analysis but chose rather to unravel the complexities of cerebral organization by analyzing nature's experiment in the evolution of the expanding pallium in the development of mammals. This method gave a certain breadth of view of the process and its results, hardly attainable under the limitations of animal experimentation.

CHARLES A. KOFOID.

Aldo Mieli.—*La science arabe et son rôle dans l'évolution scientifique.* Avec quelques additions de HENRI-PAUL-JOSEPH RENAUD, MAX MEYERHOF, et JULIUS RUSKA. XIX+388 p. Leiden, BRILL, 1939 (12.50 florins).

J'ai examiné avec curiosité ce livre qui était annoncé depuis assez longtemps et dont j'avais lu des fragments dans la belle revue portugaise *Pedro Nunes*. Il se compose d'une introduction d'une trentaine de pages, puis de notes sur la science arabe — généralités, histoire de la science en orient, puis en occident, transmission de la science arabe à l'occident chrétien. L'auteur a ajouté à cela une série d'autres notes relatives à

l'Académie d'histoire des sciences qu'il a fondée en 1927, à la science arabe aux XIVe et XVe siècles, aux listes d'ouvrages arabes à éditer, à la correspondance entre les années de l'hégire et les années chrétiennes, à une bibliographie raisonnée. Le tout a été indexé avec beaucoup de soin. On a de suite l'impression que l'ouvrage n'est pas d'une seule venue; il a grandi par la juxtaposition d'additions successives plutôt que par une intussusception organique. Comme l'auteur l'indique lui-même, le livre doit son origine à des conférences faites à Cluj, Paris et Cascais. Ceci justifie plusieurs bizarreries qui seraient autrement inexplicables. Par exemple, quoique l'introduction soit fort courte (30 p.) et à peine suffisante pour rendre compte de la façon la plus brève des vraies origines de la science arabe, l'auteur nous y donne un aperçu de la science de l'Égypte, de la Mésopotamie, de l'Inde et de la Chine, qui est tout à fait déplacé. La base de la science arabe c'est la science grecque, et dans une mesure beaucoup moindre (mais peut-être plus grande que nous ne le croyons maintenant) quelques livres sanscrits. C'est cela qu'il aurait fallu expliquer et pour quoi trente pages auraient encore été beaucoup trop courtes.

Je ne songe pas à critiquer ce livre en détail et dois me borner à quelques réflexions générales. La chose la plus extraordinaire, c'est le traitement séparé des savants arabes de l'occident. En réalité, les idées scientifiques et philosophiques ont été transmises avec une grande rapidité d'orient en occident. La transmission dans le sens contraire n'a pas été aussi rapide ni aussi complète, mais le progrès des idées en occident a toujours suivi de fort près celui de l'orient. Don Miguel Asín y Palacios a donné de cela plusieurs exemples et j'en ai donné d'autres dans mon *Introduction*. En voici un : les idées des Frères de la pureté développées à Baṣra vers 983 furent discutées en Espagne avant la fin du siècle ou tout au début du siècle suivant. Cela n'est pas étonnant. Le grand pèlerinage obligeait constamment les savants d'occident à visiter leurs confrères d'orient; ils le faisaient d'ailleurs sans se hâter, leur voyage durait souvent des années car ils s'arrêtaient longuement dans les centres religieux et lettrés et parfois il s'y établissaient à demeure et ne revenaient plus. C'est le cas par exemple du philosophe de Murcie, Ibn ʿArabî, qui mourut à Damas en 1240. (Je suis allé saluer sa tombe dans un faubourg de Damas au printemps 1932). A cause de ce pèlerinage, la science du monde islamique se développa avec beaucoup plus d'homogénéité qu'il n'eut semblé possible. Il y eut, il est vrai, des divergences religieuses et théologiques, mais la seule qui fut assez profonde pour séparer à peu près complètement deux groupes hostiles (sunni et shiʿa) ne sépara point les orientaux des occidentaux, mais les orientaux d'autres orientaux. On objectera que les idées d'Averroës ne furent pas populaires en Orient

mais cela est une toute autre question. Elles ne se répandirent guère, non point parce que l'orient était séparé de l'occident, mais parce qu'elles étaient antipathiques aux esprits orthodoxes et qu'à ce moment, ceux-ci avaient le dessus. Quand on sépare l'orient de l'occident islamique, on brise donc sans aucun profit l'ordre chronologique et la continuité naturelle des faits et des idées.

M. MIELI sait cela fort bien. Pourquoi donc a-t-il adopté cette classification artificielle ? Je ne puis imaginer d'autre raison que la suivante. La bibliographie « érudite » de son livre est empruntée dans une très large mesure à mon *Introduction*. Cela est assez évident pour quiconque connaît bien le sujet ou veut faire quelques sondages, mais c'eut été encore plus évident, si les savants avaient été tous cités dans l'ordre chronologique comme je l'ai fait. Il fallait coûte que coûte donner ces informations à peu près identiques dans un ordre nouveau, même si cet ordre était moins bon.

L'auteur attache beaucoup d'importance à la transcription des noms propres, et en principe je suis d'accord avec lui, mais je crois qu'il exagère. Ce qui importe c'est d'éviter la confusion, et donc de s'en tenir à un système déterminé, mais je ne vois pas bien ce qu'il y a à gagner en utilisant dans un livre français des formes telles que ARISTOTELES et EUKLEIDES, ou bien encore Lisboa pour Lisbonne, ou Miṣr al-Qâhira (une forme qui serait pédantesque même en Egypte) au lieu du Caire. Cela paraît fort savant mais n'est que de la poudre aux yeux. M. MIELI me fait songer à ces vieux herbalistes qui prenaient beaucoup de soin à nous dire les noms des plantes en plusieurs langues, mais ne nous apprennaient rien de neuf à leur sujet.

Pour l'historien des sciences qui n'est pas un arabisant, c'est-à-dire pour la majorité des lecteurs de ce livre, la forme exacte des mots arabes n'a pas d'importance. L'obliger à retenir ABÛ 'ALÎ MUḤAMMAD IBN 'ÎSÂ s'il ne sait pas ce que les signes employés signifient, c'est l'obliger à s'encombrer la tête de connaissances illusoires. Peu m'importe qu'un de mes élèves dans un examen écrit, écrive RHAZES, ARRAZI, AL-RÂZÎ, etc. pourvu qu'il s'en tienne à une forme déterminée et surtout qu'il dise des choses exactes au sujet de ce personnage. Pour l'arabisant la forme exacte d'un nom *est* importante, surtout si le nom est inusité, parce que cela lui permet de reconstituer la graphie originale, de « voir » celle-ci, « d'entendre » le nom proprement accentué, de le retenir (1), et au besoin de le retrouver dans les index arabes. Cependant, dans la plupart des

(1) Bien entendu ce que l'arabisant retient c'est la graphie arabe, qu'il transcrit quand il le faut. Cela est facile, tandis que retenir les transcriptions sans les comprendre, est presque impossible; c'est un exercice de mémoire idiot.

cas, il n'a pas de difficulté à évoquer la graphie arabe, quelle que soit la transcription, à moins que celle-ci ne soit vraiment trop fantaisiste.

Ce livre est un excellent symbole de l'ignorance générale relative à nos études. Par « nos études » je veux dire d'une part, les études arabes et d'autre part, l'histoire des sciences. Dans d'autres domaines mieux connus du public instruit, un tel livre serait presque inconcevable. Par exemple si quelqu'un s'avisait d'écrire un livre sur la science grecque, la première chose que l'on se demanderait serait « L'auteur est-il un helléniste ? » Bien entendu on n'exigerait pas qu'il ait découvert de nouveaux manuscrits ou édité des textes, mais on s'attendrait à ce qu'il puisse contrôler les traductions sur les originaux, et lire sans trop de difficulté les textes non traduits. Cela seraient en quelque sorte des conditions minimales sans lesquelles on ne l'écouterait même pas. Pourquoi faut-il en agir autrement quand l'arabe est en jeu ? (2) On pourrait maintenir qu'il est plus nécessaire d'être avant tout un honnête arabisant pour étudier la science arabe, qu'il ne l'est d'être un bon helléniste pour étudier la science grecque, car dans le premier cas les traductions sont moins nombreuses et les travaux d'approche moins solides, et souvent même inexistants.

D'autre part, le fait qu'un bluff de cette dimension puisse être fait par le « Secrétaire perpétuel de l'Académie internationale d'histoire des sciences » prouve assez que cette Académie n'a pas encore établi de bonnes traditions. Serait-il concevable que le secrétaire d'une académie des sciences, fût-elle assez modeste, écrivît un traité de physique sans connaître de première main aucune partie de cette science ?

Je ne suis pas philologue et les discussions qui amusent les philologues de métier m'agacent souvent. Il ne faut pas exagérer l'importance des mots et des signes (je l'ai déjà dit plus haut); ce sont les choses, les réalités, qui importent. Mais il n'en est pas moins vrai qu'on ne peut avoir de vrais contacts avec les réalités arabes que si l'on connaît l'arabe assez bien. L'historien de la science qui ne peut lire les textes originaux avec assez de facilité est exactement dans la même situation que celui qui n'a pas reçu d'éducation expérimentale. Tous deux parlent de choses qu'ils ne connaissent point.

Ce jugement paraîtra sévère, mais je ne puis le dissimuler parce que l'auteur n'a aucune indulgence pour les autres, même ceux dont il a usé sans vergogne. Par exemple, il nous dit des *Penseurs de l'Islam* du baron CARRA DE VAUX (p. 298) : « L'ouvrage est d'une lecture suggestive bien que relativement superficiel et écrit en vue du grand public ». Les

(2) Voir réflexions analogues dans *Isis* 29, 145. J'y reviendrai autant de fois qu'il le faudra. On finira bien par m'entendre.

mots « relativement superficiel » dans la bouche de M. MIELI nous font sourire. M. CARRA DE VAUX est un arabisant de vieille date, qui a édité plusieurs textes importants, et connaît les choses dont il parle. Sans doute n'a-t-il pas voulu dans ces volumes nous dire tout ce qu'il savait, ni surtout plus qu'il n'en savait. Écrivant pour le grand public, il est toujours resté en deça plutôt qu'au delà de ses connaissances. Le grand malheur c'est que M. MIELI fasse plutôt le contraire, et tâche toujours de suggérer des connaissances qu'il n'a pas, ou dont les racines sont tout à fait insignifiantes. Il juge cavalièrement des livres qu'il n'a pas étudiés (s'il les a lus de bout en bout), et dont il ne pourrait apprécier la valeur qu'en consultant des sources qui lui sont fermées. Cela n'est pas de l'érudition, mais du bluff.

Bien entendu son livre rendra de grands services, car il contient une masse d'informations considérable et facile à consulter. Son plus grand service sera peut être d'éveiller l'intérêt et de diriger l'attention des étudiants dans une direction nouvelle. L'œuvre qui reste à faire est immense, et le nombre des arabisants qui ont une culture scientifique suffisante pour s'intéresser à des textes purement scientifiques, beaucoup trop faible. J'ajouterai que l'étude de la science arabe qui est essentielle pour la compréhension de la pensée médiévale est aussi notre meilleure méthode à présent pour l'exploration de la science hellénistique. C'est-à-dire nous avons plus de chances de retrouver de nouveaux textes grecs dans des manuscrits arabes que dans des manuscrits grecs, ceux-ci étant beaucoup mieux connus. Voir par exemple, les recherches archimédiennes arabes du regretté CARL SCHOY (*Isis* 8, 21-40, 1925).

Dec. 6, 1938. GEORGE SARTON.

Ernest R. Trattner.—*Architects of Ideas.* 426 pag. New York : CARRICK & EVANS, Inc., 1938. ($3.75).

Books for the layman about scientists and their achievements have never had such a vogue as they enjoy at present. This vogue, there is reason to believe, is not one that will soon pass; it is, therefore, a matter for congratulation that the quality of the supply noticeably increases with the rise in the demand, and promises so to continue for the future. In the present excellent work Mr. TRATTNER makes a departure from the customary procedure which treats the man as large as his work and concentrates his attention instead upon the genesis and nature of the man's most significant theoretical contributions to science. His method is to lead up to the theory he is to describe by an historical analysis and survey of the ground covered by earlier workers in the same field, and to present a composite picture of the status of the subject at the time when his " architect " arrived at his theory. In this way Mr. TRATTNER covers

a far wider field than is indicated by the title of his book, and discusses the work of a far greater number of thinkers than is suggested by his table of contents. In his choice of " architects " Mr. TRATTNER has also made something of a departure from the usual practise, and gratifyingly includes a number of thinkers who have not previously quite received the attention they deserve from the writers of such works. The great architects of ideas whose chief contribution to knowledge Mr. TRATTNER discusses are COPERNICUS, HUTTON, DALTON, LAVOISIER, RUMFORD, HUYGENS, MALTHUS, SCHWANN, DARWIN, MARX, PASTEUR, FREUD, CHAMBERLAIN, BOAS, and EINSTEIN. It will be observed that there are quite a number of thinkers in this gallery who have thus far received scant, if any, notice in the similar works of other writers. It is greatly to be hoped that the example set by Mr. TRATTNER will be followed by others for, as readers of *Isis* do not need to be told, the material ready to hand is virtually inexhaustible. The interest of the reading public in the history of science as exemplified by the lives and thoughts of the great scientific thinkers, told in such very readable books as Mr. TRATTNER's, is very encouraging, and may even have repercussions in our universities which, nominally at least, are supposed to be interested in everything.

Mr. TRATTNER's book is both attractively and soundly written and should enjoy a great success. There are a few unimportant errors in the book which may be allowed to pass here, but such a statement as that " no blood passes from the mother to her child in her womb " (p. 363), deserved some further elaboration. A bad slip is the statement that EDDINGTON and DIRAC are at Harvard (p. 403). The least satisfactory essay in the book is the one on BOAS. Mr. TRATTNER appears to rely almost exclusively for BOAS' views on race upon the latter's *Mind of Primitive Man* (New York, 1911), although in his bibliography Mr. TRATTNER does refer to one or two additional works by BOAS. It was, of course, Mr. TRATTNER's purpose to draw attention to and to dwell upon the first really efficient scientific treatment of the subject of race, and it was only just that he should have given it so much attention; but our point is that BOAS' contribution could have been very much more effectively presented if Mr. TRATTNER had rounded out his essay with a brief account of BOAS' ideas on the same subject since the publication of his book nearly thirty years ago, (Cf. the completely revised 1938 edition of *The Mind of Primitive Man*). But this is, perhaps, a quibble. Mr. TRATTNER has done an extraordinarily good piece of work and is to be heartily congratulated upon it. The bibliography of 355 titles is a most excellent one of chiefly modern, and to the general reader, easily accessible works; the index, alas, is not so good, for it is an index only of names. The format of the book is very satisfactory and the new

firm of CARRICK & EVANS is to be congratulated upon the publication of so excellent a book.

Hahnemann Medical College, Philadelphia. M. F. ASHLEY-MONTAGU.

Organon.—*International Review.* Published by the Mianowski Institute for the Promotion of Science and Letters. Warsaw, Poland. Editor : SANISLAW MICHALSKI. Volume I, 1936; Volume II, 1938.

Organon is an international journal devoted to the science of science. It represents the extension to an international scale of the activities which the Mianowski Institute has so well rendered to Polish science and letters in the some fifty years of its existence. It is the international complement to *Nauka Polska* (*Science and Letters in Poland*) which beginning in 1918, has, in the words of its editor, STANISŁAW MICHALSKI, gradually extended its interest from the practical encouragement of Polish science " to the treatment of various psychological problems connected with creative research work, of the social conditions under which Science has developed, and also of the question of the connection of Science with other branches of civilization." The record of this development is made available in the Bibliography (appended to Volume I) of the articles published in the first twenty volumes of *Nauka Polska*, and in the history of the Mianowski Institute given on pages 279-286 of the same volume. *Organon* has a rich background of the Institute and the experience of its editor upon which to draw.

The science of science to which the journal is to be devoted is conceived as " covering practically the whole field of organized knowledge." The conception is developed in the valuable opening article on The Science of Science by MARJA OSSOWSKA and STANISŁAW OSSOWSKI. It is there indicated that the science of science includes the philosophy, psychology, sociology, and history of science, as well as practical problems connected with the organization and encouragement of science. The article includes a good defense of the position that the importance of the science of science is so great that it should be recognized as an autonomous unit in educational institutions—a point to which we return later.

It is of interest that *Organon* makes its appearance at a time when there is a vigorous and growing international interest in the unity of science. The *International Encyclopedia of Unified Science*, the journal *Erkenntnis* (soon to be reorganized under the title *Journal of Unified Science*) and the International Congresses for the Unity of Science are all concerned with philosophical, psychological, sociological, and historical aspects of science. Nevertheless, the difference of emphasis is clear : these latter projects stress much more the logical aspects of the science of science, while

Organon (at least in the first two volumes) stresses more the cultural relations and the problems of organization of science.

The first volume (as is fitting) is much concerned with Polish matters, and includes among other writings an article on COPERNICUS, a long essay on science and scholarship in Poland up to the end of the fifteenth century, and a 154 page analysis of the organization of Polish science. The second volume contains articles on the relation of science to philosophy, to culture, and to teaching, and a 103 page report on the responses received to questionaires on the organization of scientific congresses; it also contains a very good review section of current literature on the science of science—one of the most useful features of the two volumes.

Within the wider movement to make science an object of scientific investigation (i.e. to erect what the reviewer has called metascience) *Organon* can play a useful role by its primarily practical emphasis upon the sociological and cultural context of scientific activity. The unity of science movement and the history of science movement furnish different emphases within the same wide program. The suggestion in *Organon* that the science of science should have its own autonomous organization in educational institutions has long been the contention of the reviewer, and it is to be hoped that *Organon* will take an active part in bringing about the actualization of this suggestion. There should be in all institutions interested in a vigorous and self-conscious science, or in an integrated educational curriculum, a department of the science of science, devoted in general to the scientific enterprise in its totality, and concerned in particular with the logic, the sociology, and the history of science.

University of Chicago. CHARLES W. MORRIS.

Bertrand Russell.—*The Principles of Mathematics.* (Second edition) XXXIX+534 p. W. W. NORTON and Co., New York, 1938. (Price $5.00).

This classic of BERTRAND RUSSELL, justly celebrated as the culmination of a rich development in mathematical thought that belonged primarily to the later years of the nineteenth century, has been reissued in a second edition. There is no alteration or change in the work except a ten-page introduction, which, however, carries much interest in its expression of the author's reactions to those modern movements largely inspired by his own writings.

RUSSELL's reasons for leaving the work unaltered are contained in the following statement : " *The Principles of Mathematics* was published in 1903 and most of it was written in 1900. In the subsequent years the subjects of which it treats have been widely discussed, and the technique

of mathematical logic has been greatly improved; while some new problems have arisen, some old ones have been solved, and others, though they remain in a controversial condition, have taken on completely new forms. In these circumstances, it seemed useless to attempt to amend this or that, in the book, which no longer expresses my present views. Such interest as the book now possesses is historical, and consists in the fact that it represents a certain stage in the development of its subject."

The author reaffirms his belief in the unity of mathematics and logic. "The fundamental thesis of the following pages, that mathematics and logic are identical, is one which I have never since seen any reason to modify."

Perhaps the comment most interesting to mathematical fundamentalists pertains to the controversy which has waged for some years over the logical tenets of the formalist school, headed by DAVID HILBERT, and the intuitionists, led by L. E. J. BROUWER.

Since the reader may not be familiar with this struggle over the foundations of mathematics, it may not be out of place to sketch the principal contentions of the two schools. HILBERT's theory was first published under the title: "Über das Unendliche," *Mathematische Annalen*, Vol. 95, 1925, pp. 161-190, a French translation appearing the next year in *Acta Mathematica*, Vol. 48, 1926, pp. 91-122. BROUWER's philosophy and a bibliography of his main contributions is perhaps most accessible to English readers in a paper by ARNOLD DRESDEN: "BROUWER's Contributions to the Foundations of Mathematics," *Bulletin of the American Mathematical Society*, Vol. 30, 1924, pp. 31-40.

BROUWER's principal thought may be epitomized by saying that he refuses universal validity to Aristotelean logic. He leaves untouched the principles of identity: "a is a," and contradiction: "a is b and a is not b cannot hold simultaneously," but he denies the postulate of the excluded middle: "of the two propositions a is b and a is not b, one must always hold irrespective of what a and b may be." His philosophy assumes the form of a higher pragmatism, since his denial of the law of the excluded middle is derived from the operationally inaccessible nature of the transfinite. Thus let us construct a number which is to be equal to 1 if, in the decimal development of π, there is a sequence of numbers 123456789, but which is 0 if no such sequence exists. Can we then say that this number is either 1 or 0? BROUWER denies that we can thus apply the law of the excluded middle, since the actual determination of the existence of such a sequence as that assumed is beyond the reach of any algorithm known to mathematics. The question is buried in the inaccessible region of the transfinite. This point of view is closely related to the "operational" philosophy of P. W. BRIDGMAN, who excludes

meaningless questions from the domain of physics by a similar empiricism. Thus the statement that " time either flows or it does not flow " is excluded by BRIDGMAN on the basis that the nature of time is a transfinite matter unattainable by operational processes.

HILBERT, on the other hand, advances symbolism to a place of prime importance in logical thought and the solution of problems imposed by infinite processes is made by means of a transfinite axiom stated in formal symbols and free from the possibility of contradiction. This HILBERT calls " the axiom of free choice." To this he adjoins one restraint. " There is in fact one condition, and one only, but absolutely necessary, on which depends the application of the method of ideal elements : it is the proof of *non-contradiction :* the extension of a domain by the adjunction of ideals is legitimate, in fact, only if there results no contradiction in the old limited domain, if in consequence the relations which one finds for the old elements by the elimination of the ideal elements are the relations which were already verified in the old domain."

One of the most interesting applications of HILBERT's transfinite axiom known to the reviewer is found in the clash between the relativity spaces of DE SITTER and EINSTEIN. These philosophers employ the same theory and the same invariant relationships. They differ in only one important respect, namely, their answer to the following question : What is the asymptotic form of the coefficients of the space-time metric, the so-called gravitational potentials, *at infinity?* DE SITTER's answer is one of the most important philosophical pronouncements ever made. " How they (the gravitational potentials) are in those portions of space and time of which our observations have not yet penetrated, we do not know, and how they are at infinity (of space and time) we shall never know. All assumptions regarding the value of them at infinity are therefore extrapolations which we are free to choose in accordance with theoreticalor philosophical requirements." The result of this application of the transfinite postulate is very remarkable. DE SITTER found his philosophical requirement by setting all the gravitational potentials zero at infinity. The direct consequence of this was a prediction that the spectra from very distant stars would shift toward the red, this shift being linear with distance. Astronomers are agreed that this law is observationally verified. EINSTEIN, on the other hand, found his philosophical satisfaction in a choice which made the gravitational potentials at infinity equal to the same potentials in a space empty of matter. The direct consequence of this was to demand more matter in the universe than had yet been discovered by the astronomers. This new matter was immediately found in the enlarged view of the nature of the spiral nebula. Where then is the law of the excluded middle? Can we say that the

gravitational potentials at infinity are either as DE SITTER wanted them, or as EINSTEIN wanted them, or as something different from either?

Because of the deep-seated nature of the contentions and their ultimate repercussion upon the foundations of mathematics, it is interesting to note RUSSELL's reactions to the two schools. He dismisses the formalists' views principally by a pragmatic argument. "Our reasons" says the author, "for being specially interested in the axioms that lead to ordinary arithmetic lie outside arithmetic, and have to do with the application of number to empirical material." Hence the emphasis on non-contradiction and the neglect of existence theorems by the formalists has no appeal for RUSSELL who concludes: "The formalists are like a watchmaker who is so absorbed in making his watches look pretty that he has forgotten their purpose in telling the time, and has therefore omitted to insert any works."

RUSSELL has no ready refutation of the intuitionists' philosophy, although he says that he does not believe it to be true. He argues that, since only those domains are knowledge to which we may go by direct operational methods, then "we must not make any general statement... about a collection defined by its properties... This would make a clean sweep of all science and of all mathematics, not only of the parts which the intuitionists consider questionable."

In another place RUSSELL admits certain modifications about equivalent definitions of infinity in the light of the unprovability of ZERMELO's axiom of selection which "asserts that, given a set of mutually exclusive classes, none of which is null, there is at least one class consisting of one representative from each class of the set."

The author devotes considerable space to a clarification of the notion of logical constants. He asks three questions: First, are there such things? Second, how are they defined? Third, do they occur in the propositions of logic? In answering these questions he is led to an interesting admission: "At the time when I wrote the 'Principles' I shared with FREGE a belief in the Platonic reality of numbers, which, in my imagination, peopled the timeless realm of Being. It was a comforting faith, which I later abandoned with regret."

The abandonment of this faith led to great difficulties with the logical constants and he has been forced some distance toward the semantic position occupied by CARNAP and others. RUSSELL concludes: "Logical constants, therefore, if we are to be able to say anything definite about them, must be treated as part of language, not as part of what the language speaks about. In this way, logic becomes much more linguistic than I believed it to be at the time when I wrote the 'Principles'."

The author concludes with some remarks on the contradictions which

originally led POINCARÉ to his piquant comment : " Logistics is not sterile; it engenders contradiction ! " Assuming the linguistic position cited above, RUSSELL finds a reappraisal of the antinomies necessary.

The concluding paragraph summarizes the author's final views. " Broadly speaking, I still think this book is in the right where it disagrees with what had been previously held, but where it agrees with older theories it is apt to be wrong. The changes in philosophy which seem to me to be called for are partly due to the technical advances of mathematical logic in the intervening thirty-four years, which have simplified the apparatus of primitive ideas and propositions, and have swept away many apparent entities, such as classes, points, and instants. Broadly, the result is an outlook which is less Platonic, or less realistic in the mediaeval sense of the world. How far it is possible to go in the direction of nominalism remains, to my mind, an unsolved question."

We thus see upon what shifting sands is erected the great edifice of mathematics. What, we may ask, will be the status of these logical foundations a century from now? Will we have returned again to the Platonic ideals?

Northwestern University. H. T. DAVIS.

Johan Hjort.—*The Human Value of Biology.* XII+241 p. Harvard University Press, Cambridge, Mass., 1938. Price $2.50.

The present volume is a set of ten lectures delivered at the biological laboratory of the University of Oslo. The purpose of the author is stated as follows : " The aim of these lectures was to impress on young students the necessity of studying and accepting scientific *method* as the ' prolegomena, ' the approach to their biological studies. Moreover, I was impelled by the desire to make my own contribution toward arousing wider interest in the importance of biological ideas, not only in respect of the special studies in all the different branches of that great science but also for the guidance of practical and social life."

The ten lectures have the following titles : Philosophy and Research; The Renaissance; The Biological Philosophy of the Renaissance; Analogies of Experience; The Study of Life; The Meaning of Species; Mental and Physiological Experience; Biology and the Science of Population; Biology and Social Service; Sociology in the Light of Biology.

It is apparent from these titles that the canvas upon which the author paints is a large one. It is obvious that the compass of so small a volume is scarcely adequate for the broad theme and there is a consequent difficulty in comprehending the picture which the author wishes to portray.

The book seeks to set forth the methods, the attainments, and the hopes

of science. It begins with a description of EUCLID's *Elements*, as the most perfect model of definition and analysis. In contrast with the mathematical method, the author heaps scorn upon those philosophies which are based upon the use of words " called forth by negative reasoning and divorced by it from nature as revealed to observation." He illustrates his point by comparing the sterility of the Middle Ages with the fecundity of the Renaissance. " The Renaissance sought a world-picture drawn in mathematical language in which new laws of nature supplanted the superstition and the arbitrary assertions created by medieval dogmatics. The attainment of this end was through the foundation of a new scientific method."

The philosophy of IMMANUEL KANT runs as a theme song throughout the volume. This philosopher is cited on the first page, in the epilogue and in numerous other places. " *The Critique of Pure Reason*, " says the author, ' must be regarded, and can only be understood, as a biological investigation of the problem of how the organism which we call man can comprehend nature."

In the light of BERTRAND RUSSELL's recent renunciation of the Platonic absolute idealism in the realm of number, commented upon by the reviewer in another place, it is interesting to note the following confession of faith : " Man has created mathematics and logic. We call them the ideal sciences because they contain nothing more than man's own activity in his world of ideas and because no objects in nature correspond to them. These constructions, in other words, do not ' exist ' in time or in space. Nevertheless, they have an independent being, a timeless being in the realm of the idea. It was PLATO and no founder of religion who first created this realm."

In his chapter on the " analogies of experience " the author enters the realm of modern physics. By his " analogies " he means merely the reinterpretation by mathematical formulations of the relationships that have been discovered by empirical statistics. These formulations are logical schema, which codify experience and furnish rational bases for the further penetration of nature.

From the purely physical problem, the author turns to mental and physiological experience. Here he does not go beyond the point of view of the behaviorist. He concludes merely that " there is the closest relationship between the structures of organisms and their ability to receive impulses from the outside world and to react to them." In his chapter on population he reaffirms this view. " Thus all life originates and persists as an interaction between the functions of living organisms and the factors within their environments."

The author's chapter on biology and social service is interesting not

only for its conclusions, but also because it touches on the work to which the author has himself devoted his life, the study of marine fisheries. The social problem, as he sees it, is concerned principally with the factors of production. Upon the dictum of GOETHE that "we need not travel all around the world to ascertain that the sky is blue everywhere," he comments upon the universal phenomenon of fluctuation in production by exhibiting this fluctuation in the Scandinavian fisheries. The curves which he shows of the cod fisheries would serve as admirable examples of time series for other economies. Thus the great catch around 1930 was perhaps five times that of the catch around 1917. He attributes most of the woes of human populations to "political ideologies which succeed in creating international or class wars." His solution is the simple one of science. "To create permanent institutions for exploration and prognosis, with the task of inspecting, analyzing, and coordinating experience from industries and their environments, must therefore be considered a fundamental social service."

The final chapter on sociology in the light of biology considers mainly the problem of population growth and the ancillary Malthusian problem of the relationship between population growth and food supply. He concludes that the Marxian thesis of society as a permanent war of classes, engendered by the factors of production, must give way to the ordered discoveries of science. "The instruments of observation and thought and the knowledge which science can offer to assist their work are placed at the disposal of workers in an ever-increasing degree. From this, freedom and happiness will follow. Life itself is consciously approaching the ideal of an optimum population."

Northwestern University. H. T. DAVIS.

Martin Möbius.—*Geschichte der Botanik von den ersten Anfängen bis zur Gegenwart.* VI+458 p. Jena, GUSTAV FISCHER, 1937. Price R. M. 18, Bound R. M. 20.

SACH's history of botany ended with 1860 and was devoted mainly to German contributions. It was supplemented by GREEN's history which brought the subject down to 1900 and was more cosmopolitan in its scope, but both historians dealt with the subject rather narrowly, omitting such fields as plant geography and paleobotany. The third of a century and more which has elapsed since GREEN's book was published has witnessed the expansion of numerous fields in plant science beyond the horizons of the last century, notably in genetics, cytology, plant geography, physiology, and ecology. This history is therefore much needed and will be most useful as a survey of the entire field of the history of botany.

The author has long been known as a contributor to the history of this subject and as the writer of numerous biographical sketches of botanists. This history is not, however, written primarily on the basis of personal histories of eminent botanists but rather on a much more difficult subject pattern. The history is divided into some ninety-four subjects of unequal content and great variation in scope and historical significance. The first six chapters deal with botany in the ancient world, the middle ages, and the modern period; artificial and natural systems, and the effect of evolutionary concepts on systematics. The next twenty-one deal with Cryptogamia; six with Pteridophyta; six with Gymnosperms; forty-four with Angiosperms; five with applied botany; and five with aids in botanical research and instruction. There is a personal index of about 1800 names. All biographical data are reduced to footnotes and there are no illustrations.

This plan of treating the history of botany on the topical rather than chronological or biographical basis is ideally the most satisfactory for the investigator and scholar. It is at the same time by far the most difficult to realize and still less feasible to accomplish from the standpoint of all the specialists in the various fields. Each will find the section of his interest inadequate, incomplete, and unbalanced. This mode of treatment requires a critical knowledge of the content and chronology of the world literature of the entire subject, a scope beyond the possibility of attainment in view of the annual flood of publications, to say nothing of the earlier literature. It also requires a skill in the selection of significant material which only the specialists in the several fields can hope to attain. If the topical historian relies upon the summaries and reviews of others he sometimes unwittingly perpetuates errors, omissions, and injustices.

This treatise is not exempt from such consequences of the topical method. In the fields with which the reviewer is most familiar, flagellates, plankton, and Peridiniales, the treatment is most inadequate and the contributions of the investigators cited are not critically evaluated, for example, those of EHRENBERG and STEIN, and STEIN's great contribution to the Peridiniales is credited to BÜTSCHLI. It is, however, in the treatment of the lower Cryptogamia that this history is least adequate.

In another important particular this history suffers as unfortunately do most histories, namely, in the utilization of resources in other languages than those of the writer. Although the index contains the names of eminent botanists of many nationalities, the references to those of foreign tongues are, with some notable exceptions, often very few and the textual content is often very casual and inadequate. There is a most notable absence of utilization of the contributions of not a few eminent American

botanists. Science has neither national nor class allegiances. In a history of science above all other fields the investigator should be scrupulous and untiring in his efforts to present fairly all of the sources of the development of the subject.

Fortunately the central position which German botany held pre-eminently in the last century makes the treatise of Professor MÖBIUS even with these limitations a most valuable addition to the history of science. It is of especial value in the fields of morphology, histology, and cytology, subjects largely developed in the last century and especially by German scholars. Somewhat less satisfactorily treated are the dynamics of botany in physiology, and especially in genetics. The section on applied botany makes no use of the vast material resulting from the Dutch culture in Java, the English work at Rothamstead, or the manifold activities of the experiment stations in the United States and its dependencies. The section on phytopathology has only a casual mention of virus diseases and none of plant nematodes. Possibly the only way to get an adequate history of any science is by collaboration of specialists working on a well-thought-out plan.

CHARLES A. KOFOID.

Raoul Allier.—*La psychologie de la conversion chez les peuples non-civilisés.* Tome I, *Les prodromes de la crise — la crise.* 595 p. Tome II, *Les conséquences de la crise.* 509 p. Paris, PAYOT, 1925.

Un ouvrage du même auteur, moins important et postérieur *Les non-civilisés et nous, différence irréductible ou identité foncière* (Paris 1927) a été présenté à nos lecteurs il y a longtemps (*Isis* 12, 343-347). J'ai eu la curiosité de lire *La psychologie de la conversion* parce que les problèmes qu'implique l'étude des origines de la vie intellectuelle me fascinent. Je m'étais dit que la conversion serait un sujet privilégié pour l'étude approfondie non seulement de la mentalité primitive, mais de ses aspects les plus élevés, de la conscience même. Qu'est-ce en effet que la conversion? C'est beaucoup plus qu'un changement de croyances, c'est un changement de vie, une révolution profonde. La conversion n'est possible que si l'individu qui s'apprête à l'accepter, rejette d'abord les croyances et les coutumes de sa vie antérieure; il faut qu'il fasse fi des tabous qui ont dominé son existence jusqu'alors et qu'il modifie profondément toutes ses habitudes extérieures et intérieures.

La lecture du très beau livre de M. ALLIER ne m'a point déçu, bien au contraire. C'est une mine très riche pour l'étude de la mentalité primitive. L'auteur a emprunté ses matériaux non pas à une peuplade, mais à beaucoup répandues dans le monde entier. Ses conclusions ont donc un caractère de grande généralité. Les sources utilisées par lui sont presque

exclusivement les rapports des missionnaires protestants. Au début de ses recherches il avait pensé utiliser également les documents catholiques et M. OLLÉ-LAPRUNE l'avait aidé à s'orienter parmi ceux-ci; il dut toutefois y renoncer parce que les conceptions de conversion, protestante et catholique, sont trop différentes. Il valait mieux évidemment se contenter d'une documentation moindre mais plus homogène; d'ailleurs les rapports des missions protestantes constituent une masse de documents plus que suffisante.

La différence entre les points de vue catholique et protestant peut se résumer ainsi (vol. 1, p. 15) :

" Un premier désaccord porte sur la notion propre d'Église. Avant même d'avoir un seul converti, le missionnaire catholique, du jour où il s'installe dans un pays, y introduit, avec lui-même et, pour ainsi dire, dans sa personne, l'Église et son autorité et il vient proposer aux indigènes d'entrer dans cette Église qui existe indépendamment d'eux. Le missionnaire protestant, tout en étant rattaché, dans sa patrie, à un groupement religieux dont il est le fils et parfois le mandataire, ne pensera à l'Église que le jour où il aura un nombre suffisant de convertis pour constituer avec eux une communauté. Cette communauté, il la fondera avec des hommes, avec des femmes, qui professeront ensemble quelques principes communs, qui s'efforceront de vivre une foi qui les possède vraiment. Peut-être faudra-t-il de longues années à celui qui les a appelés pour qu'il consente à les juger dignes de créer avec lui une sorte de république morale. Avec l'autre point de vue, il y a, sans doute, à réclamer de celui que l'on invite à entrer dans l'Église au moins un commencement de dispositions spirituelles et une adhésion implicite à l'autorité de cette Église. Mais ce que contient virtuellement cette adhésion se développera peu à peu, Dieu et les moyens de grâce y aidant.

Le tout est compliqué par deux conceptions différentes des sacrements et, en particulier, du baptême. En vertu de son principe essentiel, le missionnaire protestant ne se sent libre d'accorder le baptême qu'à l'homme chez qui il a constaté un changement profond et radical. Dût-il attendre dix, quinze ou vingt ans, il s'y résignerait plutôt que d'admettre trop vite au baptême un candidat, même fort bien disposé, et de lui conférer la dignité de membre responsable de la société nouvelle. Tandis qu'il est condamné par ses propres principes à cette prudence qui lui paraît élémentaire, le catholique est porté par sa foi dans les grâces agissantes de l'Église, et tout spécialement dans l'action du sacrement, à franchir le plus rapidement possible les étapes que le protestant tremble toujours de brûler avec trop de précipitation.

Les conséquences de ces deux systèmes apparaissent tout de suite dans l'attitude en face du baptême des enfants. L'œuvre de la Sainte-Enfance est dans la ligne logique des Missions catholiques. Il n'y a rien qui lui ressemble dans aucune Mission protestante, et cette absence est voulue. Une autre conséquence se marque dans le rôle que les écrits bibliques, et tout spécialement le Nouveau Testament, jouent dans l'un et l'autre effort. Tandis que les Missions protestantes ont été forcées, par leurs principes mêmes, de donner à chaque peuple évangélisé par elles l'Évangile traduit dans sa langue, il n'y a rien de pareil, au moins dans les mêmes proportions, chez les Missions catholiques. Je ne sais pas de biographie plus passionnante que celle de Mgr. HACQUARD, des Pères Blancs, par M. l'abbé MARIN; mais tout protestant s'étonne malgré lui que, dans un volume de six cents pages,

le Nouveau Testament soit cité une seule fois comme moyen d'éducation religieuse."

L'étude comparative de la conversion des primitifs de tous les coins du globe nous révèle la complexité des drames intérieurs qui se passent en eux et qui sont tout à fait semblables à ceux qui se passeraient en nous si nous devions subir des crises aussi profondes. Comme le dit M. ALLIER (p. 367) les luttes qui se produisent en eux " ne sont pas spécifiquement différentes de celles que nous décrivent, d'après leurs propres expériences, un Saint PAUL ou un RACINE."

Il n'est pas possible d'analyser ici cet ouvrage aussi longuement qu'il le mériterait, et je me bornerai à citer quelques examples qui m'ont frappé.

" L'accent mis sur des observances trop faciles est plein de dangers. On comprend que, dans l'intérêt de la vie spirituelle, un jour par semaine soit mis à part : ce n'est pas ici en question. Mais il y a un certain sabbatisme chrétien qui est particulièrement déplacé chez les non-civilisés. D'une part, ceux-ci n'ont pas coutume de se tuer de travail, et une invitation à ne rien faire le dimanche va dans le sens de leurs désirs. Ils se reposeront avec affectation le dimanche pour faire croire qu'ils n'en font pas autant les autres jours. D'autre part, une certaine façon de leur parler de la sanctification du dimanche leur rappelle un peu trop les *tabou* qui existent dans leur religion. Il leur est vraiment trop facile de se croire chrétiens ou dans une situation morale qui dispense de le devenir. ' Je ne travaille pas le dimanche, dit un mo-Souto à M. DIETERLEN. A quoi bon prier ? ' Ce qu'on appelle le sabbatisme a produit largement ses effets à Madagascar, surtout à certains moments. Il nous suffira de citer ces quelques lignes d'un missionnaire norvégien, M. JOHNSON : ' Déjà dans ses premières proclamations contre les chrétiens (vers 1835), RANAVALONA Ier parlait des chrétiens comme ' mfifady alahady ' (faisant du dimanche un tabou); des jours fastes et néfastes faisaient partie, de toute ancienneté, de la religion nationale, et les missionnaires congrégationalistes de l'ancien type étant sur ce point de vrais puritains, on ne s'étonne pas de s'entendre répéter ce que j'ai entendu dire plusieurs fois par des prédicateurs indigènes : ' Voyez combien Dieu est peu exigeant ! Il nous laisse six jours à notre propre disposition, pourvu que nous lui offrions notre service le dimanche'." (P. 182).

Remarquons que l'on pourrait faire les mêmes observations au sujet de chrétiens dits civilisés, dont la religion est plutôt dominicale que continuelle !

De longues pages sont nécessairement consacrées à l'étude de la magie et du fétichisme, mais l'auteur n'a point de peine à montrer que ces aberrations intellectuelles ne sont point spéciales aux primitifs. Ceux-ci s'imaginent souvent découvrir des rapports de causalité là où il n'y a tout au plus que des coïncidences, mais ne faisons nous pas de même bien souvent et surtout quand nous sommes dominés par des craintes ou des désirs impétueux ? Pour observer des pratiques fétichistes il n'est pas nécessaire d'aller au Congo, il suffit de faire un court séjour à Monaco (p. 257).

" Le commerce des fétiches est certainement aussi abondant dans la Principauté que dans les villages africains. Les amulettes de toutes sortes, les formules productrices de miracles y sont couramment vendues et achetées; et les clients de ce commerce extraordinaire sont des hommes qui, arrachés à l'envoûtement de la table de jeu et rentrés dans leur vie ordinaire, restent étrangers à toutes les superstitions. C'est que, dans l'atmosphère de la maison fatale, ils perdent la maîtrise d'eux-mêmes, ils sont dominés par une passion exclusive, ils voient tout à travers cette passion. Cette passion leur suggère d'apprécier de telle ou telle façon un geste accompli par un inconnu à côté d'eux au moment où la chance allait se prononcer, la façon dont ils se sont assis sur leur chaise, la présence ou l'absence de tel ou tel objet à la minute du gain ou de la perte, etc., etc. Il n'est donc pas nécessaire qu'une relation soit établie entre deux faits dont chacun a provoqué une émotion intense. Il faut, et il suffit, qu'un seul fait ait produit une émotion assez forte pour que l'esprit regarde tout à travers celle-ci. Si cette émotion supprime la réflexion active, comme c'est le cas chez l'habitué de Monte-Carlo, si elle se déchaîne chez un esprit étranger à la réflexion active, comme c'est le cas chez le non-civilisé, les hypothèses les plus folles s'imposeront au sujet et feront surgir des croyances déconcertantes."

Quoique l'auteur s'intéresse à la religion proprement dite plutôt qu'aux rites, les deux ordres d'idées ne sont pas toujours faciles à séparer. Voici un cas remarquable de développement rituel original observé à Madagascar par des missionnaires vers 1874 (p. 189):

" Arrivés à un village appelé Ambodiamontana, à quatre-vingts kilomètres environ de la capitale, ils furent on ne peut plus étonnés d'observer, parmi les membres de l'Église, la coutume suivante : au moment de piler le riz nécessaire à la fabrication du pain employé pour la communion, les gens chargés de cet office se lavaient avec soin le corps et le vêtement et nettoyaient à fond le mortier et le pilon : cela fait, ils s'enfermaient chez eux, fenêtres et portes closes, et pilaient et cuisaient le riz. Enfin, la communion une fois terminée, s'il restait un peu de pain, ils l'emportaient dans la maison commune et priaient longuement avant de le manger. ' Pourquoi faites-vous cela? ' demandèrent nos deux évangélistes. " Nous agissons ainsi de peur que les incrédules ne sachent la façon dont ce pain est fait et ne le méprisent'."

Ceci aide à comprendre comment sous l'aiguillon de consciences délicates et pédantesques, les rites tendent à devenir de plus en plus compliqués et rigoureux.

Ce qui constitue pour moi l'intérêt capital de ce livre excellent c'est qu'il nous prouve avec une abondance de détails précis que la conscience des primitifs n'est aucunement différente de la nôtre. Bien entendu ils sont fort ignorants et leur expérience collective est beaucoup moins riche, mais leur raisonnement est tout à fait semblable au nôtre, aussi droit que le nôtre, quand les problèmes à résoudre n'engagent pas leurs émotions, aussi capable de déviations et d'aberrations quand les passions sont en jeu. Etant donnés leur ignorance, les vicissitudes de leur vie, et leur grande émotivité, il ne faut point s'étonner si leurs conclusions sont souvent

fausses, mais il faut les juger avec indulgence. Nos conclusions sont-elles toujours justes, et nos réactions sont-elles toujours raisonnables? Pensez donc aux théories fantastiques de M. LUCIEN LÉVY-BRUHL sur la mentalité prélogique des primitifs; il serait difficile, même pour un primitif, de raisonner plus mal.

Rockport, Mass. GEORGE SARTON.
16 *juillet*, 1938.

P. W. Bridgman.—*The Intelligent Individual and Society.*—Pag. VII+305. New York : The MACMILLAN Co., 1938, ($2.50).

This book is well titled, but it might have been called by the question it sets out to answer : *How to live in an irrational society?* The answer, of course, is an oxymoron : *By thinking straight.* Professor BRIDGMAN's purpose is to give a critically analytic, or operational, account of his own variety of straight thinking for such suggestive value as it may have for those of his readers who are seriously interested in leading an intelligently ordered life in an unintelligently disordered society. " The intelligently ordered life is for me " writes BRIDGMAN, " first of all a life in which the relations, consequences and implications of the drives that make me go are apprehended with complete vividness—a life in which the fundamental drives are served with all possible intelligence, in which the bearing of every action on my fundamental purposes is apprehended with the greatest vividness, and every action is deliberately so chosen as to further this end with the greatest possible efficiency." Those who are acquainted with the author's previous important book, *The Logic of Modern Physics*, will find the present work as valuable and as stimulating as the former. The book is written in a style both clear and provocative, and should find a large number of readers.

As a physicist BRIDGMAN has had a great deal to do with the numerous contemporary revisions of thinking about fundamental things, and it is a fundamental thesis of his book " that the same principles which physics has discovered to control any valid reconstruction of its concepts also control any valid reconstruction of social concepts " (p. 8). This is a viewpoint which is bound to enlist the sympathy of a large number of readers, and it is likely that many who may at first be repelled by it will find themselves converted by the time that they are half way through the book; it is, at least, to be hoped so. The suggestions to be derived from physics for good social thinking are brilliantly elucidated, and the necessity for continuous critical analysis of concepts and procedures illustrated through an exposition of the operational method,—a method which readers of *The Logic of Modern Physics* will have already made part of their own thinking. By " operational " is to be understood the method

or process of assuring oneself that one understands the meaning of a term or a question by the critical analysis of what one does in using the term or in answering the question. It may be of interest to point out that this is very much what the Marxist understands by the method of dialectical materialism, which may be defined in practically the same terms. BRIDGMAN's book consists essentially of an exposition of the application of operational thinking to the process of living, and as such it is to be regarded as the most important work which has thus far been published upon the principles of applying the method of science to the art of living.

In his Preface BRIDGMAN disclaims more than a limited acquaintance with philosophical literature, and the pages of his book are quite unburdened by references to any school of philosophic thought. Since, in the opinion of the reviewer, as well as in that of some more considerable thinkers, the only true philosophy is the philosophy of scientific method, it is a matter for congratulation that the author has abjured as much as possible of the thought that is extraneous to his own. The result is a genuine testament of thinking and living in the course of which many frank things are said, which, BRIDGMAN thinks, "anyone with a ghost of sense or of social instinct knows enough to keep to himself." But, it is added, and in this lies the *raison d'être* of the book, "Although this may be a true statement, I am not willing to admit that it is a just criticism. It seems to me that we have not solved the *enfant terrible* problem, certainly the solution is not to be found by the method of the conspiracy of silence. I believe that it is important to know where one's naked mind will take one, restricted by no inhibitions whatever as to social or other consequences. What to do about it afterward is another and more difficult question which every individual will to a certain extent have to work out for himself" (p. v).

Such an inquiry and analysis is in our own time of particular value, and that it should come from the mature mind of a disciplined and rigorous thinker is something to be particularly grateful for. It is not too much to say that a work such as this is capable of changing the whole course of an individual's life, and of how many books can this be said? For those who are willing or able to take advantage of BRIDGMAN's experience both as a thinker and as a member of society the book will be of inestimable value. Perhaps those alone who have had to learn by bitter experience what is here so challengingly and lucidly written are capable of appreciating to the full the value of such a work. It was COLERIDGE, I think, who said that experience is a good schoolmaster but that the fees were somewhat heavy. For the price of admission to a play the experience and the answers are all in BRIDGMAN's book.

Not everyone will agree with everything that BRIDGMAN writes, and

there are a few points at which the author himself fails to apply the operational method, as for example in his references to Russia, and to the alleged relation between prolonged rational thought and hard work; there may be room for argument here and with other statements elsewhere in the book, but with the main thesis there can be nothing but agreement, and for its expression nothing but praise.

Hahnemann Medical College, Philadelphia M. F. ASHLEY-MONTAGU.

F. S. Marvin.—*The New Vision of Man.* Pag. 171. GEORGE ALLEN & UNWIN Ltd., London, 1938, (5/-).

Within the brief compass of this volume Mr. MARVIN brilliantly traces the rise of man to such humanity as he has attained, and delineates the means by which he considers mankind may advance towards the accomplishment of that full " humanitas " which would appear to be the natural development of his history and being. Above all, Mr. MARVIN, as a good humanist, is an optimist. The recent wholesale defection of large masses of civilized men from the ideal of " humanitas " is regarded as a transient aberration from the straight but narrow way from which mankind as a whole will not be deflected, and to which these erring masses will some day return. I must confess to a sympathy for Mr. MARVIN's thought, even though I see in it a perfect example of leisure-class thinking; the kind of thinking that made HITLER, MUSSOLINI and FRANCO possible, and LENIN almost impossible.

By intelligent education, by the proper training of our teachers, and the proper synthesis of knowledge, Mr. MARVIN hopes eventually that mankind will enter into the full share of its birthright, of humane understanding of the world, of himself, and of his fellows, an inheritance which will at once constitute both the highest good and the highest happiness. This is a splendid ideal, and education of the individual in the truest sense could, no doubt, achieve at least part of this ideal. But how, one may ask, is the correct sort of education and synthesis of knowledge to be brought about in a State which is hostile to the correct sort of education and which renders it impossible because such education would be completely contrary to the ideals of those who are at its helm, and who are supported by a powerful number of others with similar State ideals? Mr. MARVIN thinks the idea of a League of Nations a beautiful one. So do we. Mr. MARVIN deplores the fact that it has been rather badly let down by certain unspecified nations, and hopes that the future may see an improvement in its status and in its efficiency; but never once does Mr. MARVIN ask himself why this beautiful idea

has been made to fail, why in fact it was created, and who actually caused it to fail. These, I suggest, are very pertinent questions. Mr. MARVIN emphasizes the great place which science has played and must continue to play in the progress of mankind, and thinks it a matter for congratulation that working men are now turning from the study of economics (are they?) to the study of more " humane " subjects. Strangely enough, Mr. MARVIN nowhere betrays a sign that he is conscious of the fact that the only scientific analysis of the chief ills of modern society has come from an economist whom working men fortunately continue to study. May I, with all the respect that is due Mr. MARVIN, suggest that had he devoted more study to the subject of economics and less to the study of humanity in the abstract, he might by that means have arrived at a fuller understanding of the modern dilemma of humanity than he appears to have done in this book? It is the economic royalists who created the League of Nations to serve as a smoke screen for their own activities; it is they who, when they had done with it, let it down, and it is they who maintain the armies of the insurgent FRANCO—since Mr. MARVIN speaks of these matters—against the elected government of the people because the former is on their side and the latter not. It is they who keep the Non-Intervention Committee from intervening, and it is they who would and do make Mr. MARVIN's humanity impossible. Surely, it is obvious that if all this is true then there can be no advance until these antinomian forces are controlled, for unless we who can see the virtue in Mr. MARVIN's ideal of humanity control them, they will crush us. It is the great paradox of our time that the true visionary can have no use for visions. Mr. MARVIN moves our heart, but he cannot delude our mind. In a world of stark realities the new vision of man is a Fascist's nightmare and a philosopher's dream—a gas-mask upon the skeleton of what might have been!

Hahnemann Medical College, Philadelphia.

M. F. ASHLEY-MONTAGU.

Fifty-sixth Critical Bibliography

of the

History and Philosophy of Science and the History of Civilization

(to November 1938—with special reference to B. C. centuries)

This fifty-sixth bibliography contains about 650 items of which 113 deal with B.C. centuries. They have been kindly contributed by the fifteen following scholars belonging to four different countries :

C. W. ADAMS (Hertford, England)
M. F. ASHLEY-MONTAGU (Philadelphia)
I B. COHEN (Cambridge, Mass.)
L. GUINET (Brussels)
C. A. KOFOID (Berkeley, Calif.)
C. D. LEAKE (San Francisco)
M. C. LEIKIND (Washington, D.C.)
L. LEROUX (Paris)
R. K. MERTON (Cambridge, Mass.)
D. NORMAN (Cambridge, Mass.)
J. PELSENEER (Brussels)
A. POGO (Cambridge, Mass.)
S. SAKANISHI (Washington, D.C.)
G. SARTON (Cambridge, Mass.)
A. SAYILI (Cambridge, Mass.).

This Bibliography includes as usual a series of addenda and errata to SARTON's *Introduction to the History of Science*, vols. 1 and 2 (Baltimore and London, 1927 and 1931). Its purpose and methods have been explained in the preface to the 38th Critical Bibliography (*Isis* 20, 506-08).

The sections relative to the B.C. centuries are especially full, as I have liquidated as much as I could of my stock of notes concerning them.

I have in my drawers a large number of notes which I will be glad to publish as soon as I have been able to check them upon the originals.

The historical and racial classification (Part II) contains a new section, (IV) " The New World and Africa " divided into three subsections, (*a*) America, (*b*) Oceania, (*c*) Africa. (These subsections have not been numbered in order not to disturb the numbering of sections of Part III).

I entreat the authors of relevant books and papers to send me copies of them *as promptly as possible* in order that their studies may be registered in this bibliography and eventually reviewed and discussed. By so doing they will not simply help me and every historian of science but they will help themselves in the best manner, for they will obtain for their work the most valuable publicity and its certain incorporation into the literature of the subject.

The notes were selected by me. They were typed by Miss FRANCES SIEGEL and the typing read by I BERNARD COHEN. The proofs were read by Dr. A. POGO.

Harvard Library, 185.
Cambridge, Mass.

GEORGE SARTON.
December 2, 1938.

PART I

FUNDAMENTAL CLASSIFICATION (CENTURIAL)

IXth Century B.C.

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Doerpfeld, Wilhelm. Alt Ithaka (ein Beitrag zur HOMER-Frage). 2 vols. : 399 p., 33 fig.; p. 405-42, 89 pl., 20 maps, plans. Berlin, DE GRUYTER, 1930. ISIS

Reviewed by GEORGES SEURE, *Journal des savants* 210-22, 452-62, 1932.

Hennig, Richard. Die Geographie des homerischen Epos : Eine Studie über die erdkundlichen Elemente der *Odyssee*. VI + 102 p. (Neue Wege zur Antike, ser. 1, no. 10). Leipzig, TEUBNER, 1934. ISIS

Reviewed by W. A. HEIDEL, *Geographical review* 26, 349, 1936.

Hundt, Joachim. Der Traumglaube bei HOMER. 112 p. (Greifswalder Beiträge z. Literatur- u. Stilforschg. 9). Greifswald, DALLMEYER, 1935. ISIS

Kõrner, Otto. Die Sinnesempfindungen in *Ilias* und *Odyssee*. IV + 62 p. (Jenaer medizinhistor. Beitr., H. 15). Jena, FISCHER, 1932. ISIS

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Nilsson, Martin, P. HOMER and Mycenae. XII + 283 p., 24 pl. (METHUEN's Handbooks of archaeology). London, METHUEN, 1933. ISIS

Reviewed in *Nature* 132, 585-86, 1933.

Shewan, Alexander. Homeric essays. XIII + 456 p., ill., map., pl. Oxford, BLACKWELL, 1935. ISIS

Vellay, Charles. Les nouveaux aspects de la question de Troie. 135 p., 2 fig., 1 map. Paris, Les Belles Lettres, 1930. ISIS

Reviewed by GEORGES SEURE, *Journal des savants* 210-22, 1932.

VIIIth Century B.C.

Burn, Andrew Robert. The world of HESIOD : a study of the Greek middle ages, c. 900-700 B.C. XV + 263 p. New York, DUTTON, 1937. ISIS

Reviewed by A. D. WINSPEAR, *American historical review* 53, 830-31, 1938.

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Jacobson, Thorkild ; Lloyd, Seton. SENNACHERIB's aqueduct at Jerwen. XII + 52 p., frontispiece, 36 pl. (Univ. of Chicago, Oriental Institute publications, 24). Chicago, 1935. ISIS

Reviewed by J. L. MYRES, *Journal of the royal Asiatic society* 174, 1936.

Jenkins, Romilly James Heald. Dedalica : a study of Dorian plastic art in the seventh century B.C. 94 p., 11 pl. Cambridge University Press, 1936. ISIS

Reviewed by STANLEY CASSON, *Antiquity* 10, 504-06, 1936.

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Arcieri, Giovanni, P. ALCMEONE DI CROTONE e la scuola Pitagorica. La medicina positiva nacque in Italia. Necessità storica di istituire in Crotone un centro medico universitario. 37 p. New York, Paloella Press, 1937. ISIS

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Devi, Srimati Akshaya Kumari. GAUTAMA the Buddha, his life and his religion. 160 p. Calcutta, KRISHNA (received Sept. 1938). ISIS

Gallaud, Marie. La vie du Bouddha et les doctrines bouddhiques. 220 p., 25 pl. Paris, MAISONNEUVE, 1932. ISIS

Hsü, Leonard Shih-lien. The political philosophy of Confucianism. An interpretation of the social and political ideas of CONFUCIUS, his forerunners, and his early disciples. XXII + 257 p., frontispiece (Broadway oriental library). Yenching University, 1932. ISIS

Reviewed by J. H. STEWART LOCKHART, *Journal of the royal Asiatic society*, 1025-26, 1932.

Shryock, John K. The origin and development of the state cult of CONFUCIUS : an introductory study. XIII + 298 p. New York, Century, 1932. ISIS

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Stadelmann, Heinrich. LAOTSE und die Biologie. 22 p. (Schriften der Bibliothek Sino-International). Geneva, Bibliothèque Sino-Internationale, 1935. ISIS

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Tyng, Dudley. The Confucian Utopia. *Journal of the American oriental society* 54, 67-9, 1934. ISIS

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Wilhelm, Richard (1873-1930). CONFUCIUS and Confucianism. Translated into English by GEORGE H. DANTON and ANNINA PERIAM DANTON. X + 181 p. London, KEGAN PAUL, 1931. ISIS

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Baumann, E. D. Die pseudohippokratische Schrift Peri Manies. *Janus* 42, 129-41, 1938. ISIS

Béteau, J. P. La peste d'Athènes (436-30 av. J.-C.). Préface du *L. Tanon*. 41 p. Paris, 1934. ISIS

Binswanger, Ludwig. HERAKLITS Auffassung des Menschen. *Die Antike* 11, 1935. ISIS

Reviewed by H. POLLNOW, *Thalès* 2, 254, 1935 (Paris 1936).

Blum, Rudolf. La composizione dello scritto IPPOCRATEO *περὶ διαίτης ὀξέων*. Reale Accademia Nazionale dei Lincei, *Rendiconti della classe di scienze morali, storiche e filologiche* 12, 39-84, 1936. ISIS

Blumenthal, Albrecht von. ANAXAGORAS und DEMOKRIT. *Judeich Festschrift*, p. 13-27, Weimar, 1929. ISIS

Deichgräber, Karl. Die Epidemien und das Corpus Hippocraticum. Voruntersuchungen zu einer Geschichte der koischen Ärzteschule. 172 p. (Abh. d. Preuss. Akad. d. Wiss., phil.-hist. Kl., 3). Berlin, Akad. d. Wiss., 1933. ISIS

Deichgräber, Karl. HIPPOKRATES. Über Entstehung und Aufbau des menschlichen Körpers. (*Περὶ σαρκῶν*). In Gemeinsch. m. d. Mitglied. d. philolog. Proseminars Berlin hrsg. übers. u. kommentiert. Mit einem sprachwissenschaftl. Beitrag von EDUARD SCHWYZER. XVIII + 97 p. Leipzig, TEUBNER, 1935. ISIS

Castiglioni, A. L'orientamento neoippocratico del pensiero medico contemporaneo. 51 p. Torino, Minerva Medica, 1933. ISIS

Diller, Hans. Die Lehre vom Blutkreislauf, eine verschollene Entdeckung der Hippokratiker? *Archiv für Geschichte der Medizin* 31, 201-18, 1938. ISIS

Diller, Hans. Die Überlieferung der hippokratischen Schrift *περὶ ἀέρων ὑδάτων τόπων*. VI + 190 p. (*Philologus*, Suppl.-Bd. 23, H. 3). Leipzig, DIETERICH, 1932. ISIS

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Glotz, Gustave. Histoire ancienne. Deuxième partie, Histoire grecque. Avec la collaboration de ROBERT COHEN. vol. 2, La Grèce au V^e^ siècle. III + 800 p. (Histoire générale, publiée sous la direction de GUSTAVE GLOTZ). Paris, Presses Universitaires de France, 1931. ISIS

Reviewed by JAKOB A. O. LARSEN, *American historical review* 38, 356-57, 1933.

Howald, Ernst. Die Schrift des PHILOLAOS. *Essays presented to* KARL SUDHOFF, p. 63-72, Zurich, 1924. ISIS

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Panitz, Heinz. Mythos und Orakel bei HERODOT. 71 p. (Greifswalder Beiträge z. Literatur- u. Stilforschung, 7). Greifswald, DALLMEYER, 1935. ISIS

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Pohlenz, Max. HIPPOKRATES und die Begründung der wissenschaftlichen Medizin. 120 p. Berlin, DE GRUYTER, 1938. ISIS

Powell, John Enoch. A lexicon to HERODOTUS. Cambridge University Press, 1938. ISIS

Zervos, Skevos. Les bistouris, les sondes et les curettes chirurgicales d'HIPPOCRATE. Livre d'or du Dr. THÉODORE L. PAPAYOANNOU. p. 1-63, 48 fig. Naumburg, LIPPERT, 1932. ISIS

IVth Century B.C. (whole and first half)

Bidez, J. PLATON, EUDOXE DE CNIDE et l'Orient. *Académie royale de Belgique, Bulletin de la classe des lettres*, 19, 195-218, 273-319, 1933. ISIS

Cornford, Francis Macdonald. Mathematics and dialectic in the *Republic* VI-VII. *Mind*, 37-52, 173-90, 1932. ISIS

Diès, Auguste. Le nombre de PLATON. Essai d'exégèse et d'histoire. V + 139 p. Paris, KLINCKSIECK, 1936. ISIS

Extrait des mémoires présentés par divers savants à l'Académie des inscriptions et belles-lettres, 14.

Ehrenberg, Victor. ALEXANDER and the Greeks. Translated by RUTH FRAENKEL VON VELSEN. 110 p. Oxford, BLACKWELL, 1938 (7s. 6d.). ISIS

Translation of four essays which appeared separately in German but are now reunited as they deserve. I. ALEXANDER and the liberated Greek cities; II. *Pothos;* III. ARISTOTLE and ALEXANDER's empire; IV. ALEXANDER and the Greeks.

These essays are linked together by the personality of ALEXANDER, but our readers are more interested in ARISTOTLE, that is, in essay III. " Tutor and pupil, the man of thought and the man of action, connected with each other and yet strangers by nature, ARISTOTLE and ALEXANDER were destined and united by fate to achieve ultimately the same task in the same historical moment : to bring to life the Hellenistic Oecumene, and to become the ancestors of all following phases of human history, of human intellect and human understanding." G. S.

Ekman, Erik. Zu XENOPHONS Hipparchikos. 98 p. Uppsala, ALMQVIST & WIKSELL, 1933. ISIS

Handford, S. A. The evidence of AENEAS TACTICUS on the *bálanos* and *balanágra*. *Journal of Hellenic studies* 46, 181-84, 3 fig., 1926. ISIS

Ithurriague, Jean. La croyance de PLATON à l'immortalité et à la survie de l'âme humaine. 190 p. Paris, GAMBER, 1931. ISIS

S'il " n'a pas de doctrine ferme de l'âme, s'il a douté, par instants, des arguments destinés à garantir sa croyance, on ne saurait nier que PLATON eut l'impression profonde de l'existence en nous d'un élément divin impérissable; il crut à l'âme et à sa survie." Telle est la conclusion à laquelle arrive l'auteur, en rapprochant des textes qu'il extrait principalement du *Gorgias*, du *Phédon*, du X^e^ livre de la *République*, et du X^e^ livre des *Lois*, et qu'il confronte avec la thèse générale de l'âme exposée dans le *Timée*. L. G.

Ithurriague, Jean. Les idées de PLATON sur la condition de la femme au regard des traditions antiques. 161 p. Paris, GAMBER, 1931. ISIS

Reviewed by ÉMILE BRÉHIER, *Revue des études grecques* 46, 252, 1933.

Jaeger, Werner. DIOKLES VON KARYSTOS. Die griechische Medizin und die Schule des ARISTOTELES. 244 p. Berlin, DE GRUYTER, 1938. ISIS

Morrow, Glenn Raymond. Studies in the Platonic epistles, with a translation and notes. 254 p. (University of Illinois : nos. 3 and 4 of the *Illinois studies in language and literature*, 18) 1935. ISIS

Reviewed by A. PUECH, *Journal des savants*, 86, 1936.

(Plato). Theory of knowledge : the *Theaetetus* and the *Sophist* of PLATO translated with a running commentary. By FRANCIS MACDONALD CORNFORD. XIV + 336 p. (International library of psychology, philosophy and scientific method). London, KEGAN PAUL, 1935. ISIS

Reviewed in *Nature* 136, 777, 1935.

Shorey, Paul (1857-1934). What PLATO said. VII + 686 p. Chicago, University Press, 1934. ISIS

Solovyev, Vladimir Sergeevich. PLATO. Translated from the Russian by RICHARD GILL with a note on SOLOVYEV by JANKO LAVRIN and a portrait by NORA LAVRIN. 83 p. London, NOTT, 1935. ISIS

Strycker, É. de (S. J.). Bibliotheca graeca PLATON. *Les études classiques* 7, 409-22, 1938. ISIS

Platonic bibliography.

Vira, Raghu. Discovery of the lost phonetic sutras of PĀṆINI. *Journal of the royal Asiatic society*, 653-70, 1931. ISIS

IVth Century B.C. (second half)

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Reviewed by H. J. METTE, *DLZ* 58, 1048-49, 1937.

Aristotle. Athenian constitution, Eudemian ethics, Rhetorica ad Alexandrum, Vices and virtues. Translated by H. RACKHAM. XXX + 700 p. (Loeb classical library, no. 285). Cambridge, Mass., Harvard University Press, 1935. ISIS

Aristotle. Metaphysics, books X-XIV; Oeconomica and Magna moralia. Translated by H. TREDENNICK and G. CYRIL ARMSTRONG. xx + 550 p. (Loeb classical library, no. 287). Cambridge, Mass., Harvard University Press, 1935. ISIS

Aristotle. On the soul. Parva naturalia. On breath. Translated by W. S. HETT. xx + 516 p. (Loeb classical library, no. 288). Cambridge, Mass., Harvard University Press, 1935. ISIS

Aristotle. Parts of animals. With an English translation by A. L. PECK and a foreword by F. H. A. MARSHALL. Movement of animals. Progression of animals. With an English translation by E. S. FORSTER. 556 p. (Loeb classical library, no. 323). Cambridge, Mass., Harvard University Press, 1937 ($2.50). ISIS

ARISTOTLE's *De partibus animalium*, despite its title, is physiological and teleological, the anatomical discussion of animals being found mainly in his *Historia animalium*. His teleology is somewhat similar to that of BERGSON's doctrine of internal finality according to which each individual or species is made for itself in that all its parts conspire for the greatest good of the whole and are intelligently organized in view of that end but without regard for other organisms, or kinds of organisms. Hence the failure to recognize vestigial and rudimentary organs. Although ARISTOTLE knew nothing of the chemical processes of physiology he was keen enough to conceive the processes of absorption of food and of excretion. It is presumed that ARISTOTLE's treatises combine the results of numerous research workers of his own time but the text throughout exhibits the work of the master hand in the uniformity of its character and the consistency of the teleological reasoning. This first textbook of comparative animal physiology is truly surprising in the scope, variety and extent of its accurate observations, and the completeness with which the subject is covered in the face of limitations which the modern physiologist is in a position to appreciate.
C. A. K.

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Breloer, Bernhard. Kautaliya-Studien. Bd. III : Staatsverwaltung im alten Indien. I : Finanzverwaltung u. Wirtschaftsführung. Leipzig, HARRASSOWITZ, 1934. ISIS

Broche, Gaston E. PYTHÉAS le Massaliote. 260 p. Paris, Société française d'imprimerie et de librairie, 1935. ISIS

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Cherniss, Harold. ARISTOTLE's Criticism of presocratic philosophy. XVI + 418 p. Baltimore, Johns Hopkins Press, 1935. ISIS

Corte, Marcel de. La causalité du premier moteur dans la philosophie aristotélicienne. *R. d'hist. de la philosophie* 5, 105-46, 1931. ISIS

Duyvendak, J. J. L. Notes on DUBS' translation of HSÜN-TZU. *T'oung pao* 29, 1-42, 1932. ISIS

Edel, Abraham. ARISTOTLE's theory of the infinite. 102 p. New York, *Journal of philosophy* 1934. ISIS

Reviewed by FRANCIS P. CLARKE, *Philosophy of science* 2, 266, 1935.

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Griffin, Arthur Kent. ARISTOTLE's psychology of conduct. London, WILLIAMS and NORGATE, 1931. ISIS

Reviewed by ÉMILE BRÉHIER, *Revue des études grecques* 46, 252, 1933.

Janssens, Ém. Sur un passage de l'histoire des animaux d'ARISTOTE (552 *a* 32-552 *b* 4). *Revue Belge de philologie et d'histoire* 12, 613-15, 1933. ISIS

Lazzati, Giuseppe. L'ARISTOTELE perduto e gli scrittori cristiani. X + 79 p. (Pubblicazioni della Università Cattolica del Sacro Cuore, serie quarta : scienze filologiche, 26). Milan, " Vita e pensiero, " 1933. ISIS

Reviewed in *Jewish quarterly review* 29, 209, 1938.

Mondolfo, Rodolfo. I problemi dell'infinità numerica e dell' infinitesimo in ARISTOTELE. *Rivista di filosofia* 25, 210-19, 1934. ISIS

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Strohm, Hans. Untersuchungen zur Entwicklungsgeschichte der aristotelischen Meteorologie. 85 p. (*Philologus*, Suppl.-Bd. 28). Leipzig, DIETERICH, 1935. ISIS

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Junge, Gustav. Das Euklidische Verfahren zur Bestimmung des grössten gemeinsam Teilers. *Forsch. u. Fortschr.* 8, 331-32, 1932. ISIS

Pernot, Hubert. Observations sur la langue de la Septante. *Revue des études grecques* 42, 411-25, 1929. ISIS

Reviewed by ALICE LEROY-MOLINGHEN, *Byzantion* 9, 450-51, 1934.

Timmer, Barbara Catharina Jacoba. MEGASTHENES en de indische maatschappij. 323 p. (Amsterdamer Doktor-Dissertation). Amsterdam, 1930. ISIS

Reviewed by O. STEIN, *DLZ* 5, 1688-92, 1934.

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Fabricius, Ernst. Some notes on POLYBIUS' description of Roman camps. *Journal of Roman studies* 22, 78-87, 1 fig., 1932. ISIS

Mercer, Samuel A. B. The Ethiopic text of the *Book of Ecclesiastes*. XV + 93 p., 4 pl. London, LUZAC, 1931. ISIS

Mette, Hans Joachim. Sphairopoiia. Untersuchungen zur Kosmologie des KRATES VON PERGAMON. Mit einem Anhang : Texte. XX + 316 p. München, BECK, 1936. ISIS

Segal, M. H. The evolution of the Hebrew text of BEN SIRA. *Jewish quarterly review* 25, 91-149, 1934. ISIS

Wendel, Carl. Die Ueberlieferung der Scholien zu APOLLONIOS VON RHODOS. 124 p. (fascicule 1 de la troisième série des Abhandlungen de la société des sciences de Goettingen, philologisch-historische Klasse). Berlin, 1932. ISIS

Reviewed by AIMÉ PUECH, *Revue des études grecques* 46, 265-66, 1933.

IInd Century B.C. (second half)

Jäger, Fritz. Der heutige Stand der *Schi-ki* Forschung. *Asia major* 9, 21-37, 1933 (to be cont.). ISIS

Apropos of recent studies on the *Shih-chi* of SSŬ-MA CH'IEN, for which see my *Introd.* (1, 199). G. S.

Tatakis, Basile N. PANÉTIUS DE RHODES, le fondateur du moyen stoïcisme; sa vie, son œuvre. 234 p. Paris, VRIN, 1931. ISIS

Reviewed by ÉMILE BRÉHIER, *Revue des études grecques* 46, 253-54, 1933.

Ist Century B.C. (whole and first half)

Belowski, Eleonore. LUKREZ in der französischen Literatur der Renaissance. 132 p. (Roman. Studien, 36). Berlin, EBERING, 1934. ISIS

Ciaceri, Emanuele. CICERONE e i suoi tempi. 2 vols. Rome, ALBRIGHI, SEGATI, 1926-1930. ISIS

Vol. 2 reviewed by W. A. OLDFATHER, *American historical review* 36, 100-02, 1930.

(Cicero). Correspondance, texte établi et traduit par L. A. CONSTANS. 2 vol. Paris, Belles-Lettres, 1934-35. ISIS

Reviewed by JÉRÔME CARCOPINO, *Journal des savants* 49-58, 1936.

Constans, L. A. Guide illustré des campagnes de CÉSAR en Gaule. 133 p., 8 pl., map. Paris, Les Belles Lettres, 1929. ISIS

Eginitis, D. Sur une erreur de POSIDONIUS et son influence sur la découverte de l'Amérique. *C. R. Acad. des sciences* 194, 2032-35, 1932. ISIS

Fleury, Hippolyte de. En relisant LUCRÈCE. Le livre de la nature et la physique moderne. 66 p. Paris, LAROSE, 1929. ISIS

Reviewed by P. J. RICHARD, *Revue générale des sciences* 40, 123, 1929.

Kroll, Wilhelm. Die Kultur der Ciceronischen Zeit. (Das Erbe der Alten, 2. Reihe H. 22 u. 23) Bd. 1 : Politik und Wirtschaft. Bd. 2 : Religion, Gesellschaft, Bildung, Kunst. Mit einem Beitrag von REINHARD HERBIG. 4 pl. Leipzig, DIETERICH, 1933. ISIS

Laurand, Louis. CICÉRON. 2e édition revue et corrigée. Volume complémentaire : questions diverses, bibliographie, tables détaillées. 533 p. (Collection d'études anciennes). Paris, Les Belles Lettres, 1934-35. ISIS

Mercati, Giovanni. M. TULLI CICERONIS De re publica libri e codice rescripto Vaticano latino 5757 phototypice expressi. Prolegomena de fatis bibliothecae monasterii S. Columbani Bobiensis et de codice ipso Vat. Lat. 5757, vol. XXIII, Codices e Vaticanis selecti quam simillime expressi. XII + 260 p., 1 pl. Rome, Bibliotheca Apostolica Vaticana, 1934. ISIS

Reviewed by FREDERIC M. WHEELOCK, *Speculum* 10, 432-34, 1935.

Munz, Robert. POSEIDONIOS und STRABON. Bd. 1. Voruntersuchungen. IV + 318 p. Göttingen, HUBERT, 1929. ISIS

Padoa, Alessandro. Una proposizione di ERONE ridimostrata e completata. *Period. di matem.* 14, 114-18, 1934. ISIS

Valle, Guido della. TITO LUCREZIO CARO e l'Epicureismo Campano. Cap. 1. 314 p. (Estratta dal vol. 62 degli *Atti dell'Accademia Pontaniana*). Naples, 1933. ISIS

Vowles, Hugh P. A Greek windmill. *London Times, literary supplement*, p. 414, May 15, 1930. ISIS

Apropos of the word ἀνεμούριον in HERON's Pneumatics, translated windmill. Is it not rather a wind-vane? The author is preparing a history of the windmill. G. S.

Ist Century B.C. (second half)

Rehm, Bernhard. Das geographische Bild des alten Italien in VERGILS *Aeneis*. IV + 112 p. (*Philologus*, Supplementbd. 24). Leipzig, DIETERICH, 1932. ISIS

Ist Century (whole and first half)

Celsus. De medicina. 3 vols., XIV + 449 p.; LXVII + 291 p.; p. 294 — 649. (Loeb classical library). Cambridge, Mass. Harvard University Press, 1938 (each vol. $ 2.50). ISIS

The first volume of the Loeb CELSUS was issued in 1935 with an introduction by W. H. S. JONES in which he briefly discussed the character of the work, the English translation of the Latin text being by W. G. SPENCER, who also supplied the notes. The first volume gave us the Prooemium and the first four books, now with the publication of two more volumes the work is completed and Mr. SPENCER is to be congratulated on having produced the best available edition of CELSUS in any language. His translation is excellent, and his notes and lists of alimenta, medicamenta, weights, measures, and symbols, appendices, and list of parallel passages in CELSUS and HIPPOCRATES, are invaluable. There is an excellent index.

M. F. A.-M.

Ist Century (second half)

Pliny. Letters. 2 vols., XVI + 535 p., 1931; 440 p., 1935. (Loeb classical library). Cambridge, Mass., Harvard University Press, (each volume, $ 2.50). ISIS

PLINY THE YOUNGER (61 A. D.-114? A. D.) is here published in the elegant eighteenth century translation of WILLIAM MELMOTH in the revision of W. L. M. HUTCHINSON. The revision has been very thorough indeed. Mr. HUTCHINSON supplies an introduction and a biographical index.

M. F. A.-M.

IInd Century (whole and first half)

Chabanier, Eugène. Sur le caractère mystique de la géographie de PTOLÉMÉE. *Comptes rendus du congrès international de géographie*, Amsterdam 1938, 2 (section 4), 91-100. ISIS

Neugebauer, O.; Volten, A. Untersuchungen zur antiken Astronomie IV. Ein demotischer astronomischer Papyrus (Pap. Carlsberg 9). *Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik*, Abtg. B : Studien, 4, 383-406, 1938. ISIS

" Der Text, dessen Edition und Bearbeitung wir im Folgenden vorlegen,

hat, obwohl es sich nur um drei Kolonnen eines vielleicht einstmals umfangreicheren Papyrus handelt, eine einzigartige Bedeutung : es ist der bisher *erste* Text, der uns von einer aegyptischen ' mathematischen ' Astronomie Kunde gibt. Durch die Benutzung des Jahres ANTONINUS PIUS 7 (d.h. 144 n. Chr.) als Epochenjahr einer gewissen 25-jährigen Mondperiode ist seine Niederschrift auf die Mitte des zweiten Jahrhunderts n. Chr. fixierbar, aber es kann kaum einem Zweifel unterliegen, dass die in ihm enthaltenen Rechenverfahren wesentlich älteren Ursprungs sind, da sie keine Spur einer Berücksichtigung der gleichzeitigen hellenistischen Astronomie zeigen. Man kann nur hoffen, dass endlich auch auf diesem Gebiet weitere Texte auftauchen; der unsere beweist, dass sie existiert haben."

(**Ptolemy**). Des KLAUDIOS PTOLEMAIOS Einführung in die darstellende Erdkunde. Teil 1. Theorie und Grundlagen der darstellenden Erdkunde (*ΓΕΩΓΡΑΦΙΚΗ ΥΦΗΓΗΣΙΣ* I und II Vorwort). Ins Deutsche übertragen und mit Erläuterungen versehen von HANS v. MŽIK unter Mitarbeit von FR. HOPFNER. (*Klotha*, Historische Studien zur feudalen und vorfeudalen Welt. 5). 109 p., 13 fig. Wien, GEROLD, 1938. ISIS

Reviewed by O. NEUGEBAUER, *Quell. u. Stud. z. Gesch. d. Math., Astr. u. Phys.* Abtg. B : Studien 4, 422, 1938.

IInd Century (second half)

Barraud, Dr. GALIEN et l'éducation physique. *Bulletin de la société française d'histoire de la médecine* 32, 164-77, 1938. ISIS

Holter, Kurt. Die GALEN-Handschrift und die Makamen des HARÎRÎ der Wiener Nationalbibliothek. *Jahrbuch der kunsthistorischen Sammlungen in Wien*, neue Folge, Bd. 11, 1-48, 6 pl., 45 fig., 1937. ISIS

The GALEN ms. originates from the Mosul region c. 1220-40. " Die Handschrift enthält die Hauptsätze des ersten Buches des Werkes von GALEN über die Herstellung der Drogen und beschäftigt sich ausschliesslich mit der Herstellung von Antidota gegen den Schlangenbiss. Das angebliche Werk des GALEN, der als letzter einer Reihe von neun Ärzten auftritt, die alle zur Verbesserung des Theriaks beitrugen, liegt in der Fassung des YAḤYÂ AL-ISKANDARÂNÎ AL-NAḤWI vor, der mit Sicherheit mit dem bei K. KRUMBACHER, *Geschichte der byzantinischen Literatur*, München 1897, p. 614 und 617, genannten JOHANNES VON ALEXANDRIA zu identifizieren ist, der allerdings den Beinamen ' Grammatikos,' den er bei den Arabern führt, dort nicht hat. In der arabischen Tradition gilt er als Mitglied der Schule der ' Alexandriner,' die sich die Pflege der Werke des GALEN sehr angelegen sein liessen." Elaborate study of the miniatures, illustrated. G. S.

Wenkebach, Ernst. GALENOS VON PERGAMON : allgemeine Ertüchtigung durch Ballspiel. Eine sporthygienische Schrift aus dem zweiten

Jahrhundert n. Chr. Griechisch und deutsch. *Archiv für Geschichte der Medizin* 31, 254-97, 1938. ISIS

IIIrd Century (whole and first half)

Shryock, John K. The study of human abilities. The *Jen wu chih* of LIU SHAO. With an introductory study. x + 168 p. (American oriental series, 11). New Haven, Conn., American oriental society, 1937. ISIS

Reviewed by GEORGE SARTON, *Isis* 29, 105-08, 1938.

IIIrd Century (second half)

Jackson, A. V. Williams (1862-1937). The personality of MÂNÎ, the founder of Manichaeism. *Journal of the American oriental society* 58, 235-40, 1938. ISIS

IVth Century (second half)

Bidez, J. Le traité d'astrologie cité par SAINT-BASILE dans son *Hexaemeron*. *L'antiquité classique* 7, 19-21, 1938. ISIS

Vth Century (whole and first half)

Noordegraaf, Cornelia A. A geographical papyrus. *Mnemosyne*, 6, 273-310, 10 pl., 1938. ISIS

Reviewed by CLAIRE PRÉAUX, *Chronique d'Égypte* 13, 410, 1938. Itinerary from Heliopolis to Constantinople. G. S.

Vth Century (second half)

Senn, Gustav. ASKLEPIODOTOS von Alexandreia, ein positivistischer Naturforscher des V. Jahrhunderts p. Chr. *Archeion* 21, 13-27, 1938. ISIS

VIth Century (whole and first half)

Rand, E. K. The new CASSIODORUS. *Speculum* 13, 433-47, 4 pl., 1938. ISIS

VIIth Century (whole and first half)

Andrae, Tor. MOHAMMED the man and his faith. Translated by T. MENZEL. 274 p., 1 ill. London, ALLEN and UNWIN, 1936. ISIS

Reviewed by A. S. TRITTON, *Journal of the royal Asiatic society* 624, 1938.

Bell, Richard. The *Qur'ân:* translated with a critical rearrangement of the Surahs. Vol. I, XII + 343 p. Edinburgh, CLARK, 1937. ISIS

Reviewed by ARTHUR JEFFERY, *Journal of the royal Asiatic society* 618-24, 1938.

Yabuuti, Kiyoshi. *Tô Kaigen Sankyô chû no seikyô* (On the star catalogue in the T'ang-k'ai-yüan-chan-ching) compiled between 618 and 626 A.D. *Tôhô Gakuhô* (Journal of oriental studies). Kyoto, no. 8, p. 56-74, Oct. 1937. ISIS

VIIth **Century** (second half)

Reddy, V. S. Glimpses into the practice and principles of medicine in Buddhistic India in the 7th century A.D. Gleaned from " The records of Buddhist religion " by the Chinese monk I-TSING. *Bulletin of the institute of the history of medicine* 6, 987-1000, 1938. ISIS

IXth **Century** (whole and first half)

Friedman, Reuben. The story of scabies—IV. AT TABARI: discoverer of the acarus scabiei. *Medical life* 45, 163-76, 1938. ISIS

Xth **Century** (whole and first half)

Farah, Elie. AL-FARABI. 120 p. (Les philosophes arabes). Jounieh (Liban), Imp. des Miss. Libanais, 1937 (en arabe). ISIS

XIth **Century** (whole and first half)

Bédoret, H. (S. J.). Les premières versions tolédanes de philosophie, œuvres d'AVICENNE. *Revue néoscolastique de philosophie* 41, 374-400, 1938. ISIS

(Bîrûnî). BIRUNLU EBU REYHAN. Kitabüssaydele fittib mukaddimesi. Türkçeye çeviren Şerefeddin Yaltkaya. 40 p. Istanbul, Millî Necmua Basim Evi, 1937 (in Turkish). ISIS

This is a Turkish translation of BÎRÛNÎ's introduction to his pharmacopoeia, the Arabic text of which was edited and translated into German by MAX MEYERHOF (Berlin 1932; *Isis* 20, 451-54).

Schacht, Joseph; Meyerhof, Max. The medico-philosophical controversy between IBN BUTLAN of Baghdad and IBN RIDWAN of Cairo.

A contribution to the history of Greek learning among the Arabs. 124 p.+91 p. in Arabic, facs. (Egyptian University, Faculty of Arts, 13). Cairo, 1937. ISIS

Reviewed by GEORGE SARTON, *Isis* 29, 108-10, 1938.

Ünver, A. Süheyl. L'accusation d'infidélité religieuse de FARABI et de IBNI SINA. *Türk tib tarihi arkivi* 2, no. 7, 7-8, 1938. ISIS

Ünver, A. Süheyl. Légendes vivantes et perdues dans le folklore oriental concernant IBNI SINA (AVICENNE). *Türk tib tarihi arkivi* 2, no. 8, 7-16, 1938. ISIS

Ünver, A. Süheyl. Les aphorismes d'IBNI SINA (AVICENNE). *Türk tıb tarihi arkivi* 2, no. 8, 4-7, 1938. ISIS

Ünver, A. Süheyl. Les idées de EBU REYHAN DE BIRUN sur la pharmacologie. *Tib fakültesi mecmuasi* 1, no. 2, 239-43, 1938. ISIS

Ünver, A. Süheyl. Un éloge dans lequel IBNI SINA est pris comme mesure. *Türk tib tarihi arkivi* 2, no. 6, 6, 1938. ISIS

XIth Century (second half)

al-Ghazâlî (1059-1111). Al-Risâlat al-Laduniyya. Translated by MARGARET SMITH. *Journal of the royal Asiatic society* 353-74, 1938. (end). ISIS

Luciani, J. D. (d. 1932). El-Irchad par Imam el-Haramein. V^e^ siècle (Hégire). Édité et traduit. 363 + 244 p. (in Arabic). (1830-1930, Collection du centenaire de l'Algérie). Paris, LEROUX, 1938. ISIS

Edition of the Arabic text with French translation of the " Guide to the most certain proofs of the principles of the Islamic faith " composed by 'ABDALMALIK BEN ABÎ MUHAMMAD 'ABDALLÂH BEN YÛSUF AL JUWAINÎ, Imâm al-Ḥaramain (i.e., religious leader of the two Holy Places, for he taught in both places when he accomplished the Pilgrimage in 1058). He was born near Nishâpûr in 1028 and died there in 1085. See BROCKELMANN (1, 388). G. S.

Sarton, George. The tomb of OMAR KHAYYÂM. *Isis* 29, 15-19, 1 pl., 1938. ISIS

XIIth Century (whole and first half)

Bliemetzrieder, Franz. ADELHARD VON BATH. Blätter aus dem Leben eines englischen Naturphilosophen des 12. Jahrhunderts und Bahnbrechers einer Wiedererweckung der griechischen Antike. Eine kulturgeschichtliche Studie. VII + 395 p., 2 fig. München, HUEBER, 1935. ISIS

Chabanier, Eugène. La filiation de la table de RAYMOND DE MARSEILLE et les tables dites ptoléméennes du moyen-âge. *Comptes rendus du congrès international de géographie*, Amsterdam, 1938, t. 2, 101-17. ISIS

" RAYMOND est le premier astronome qui ait su déterminer une différence de longitude avec une approximation raisonnable pour pouvoir dresser une carte géographique de la Méditerranée. Bien rares furent ceux qui parmi ses successeurs surent faire ces observations avec une précision comparable, il semble jusqu'ici qu'il faille compter parmi les véritables savants ZACUTO, YOUSEF le médecin du Roi EMMANUEL de Portugal et surtout REGIOMONTANUS."

Tatlock, J. S. P. GEOFFREY OF MONMOUTH's motives for writing his *Historia*. *Proceedings of the American philosophical society* 79, 695-703, 1938. ISIS

" GEOFFREY OF MONMOUTH's *History of the kings of Britain*, so vastly influential not only on subsequent literature, but also on historiography and even politics, was written between 1130 and 1138. GEOFFREY undoubtedly was of British descent, probably Breton, since he exalts the Bretons and slurs the Welsh. One of his motives in writing was to provide the British people with an honorable early history, which they had lacked up to that time, but which their neighbors, the English and French of various provinces, were acquiring on a large scale just before he wrote. His other motives in writing were probably to afford precedent for the Empress MATILDA's candidacy for the English throne; and also for the imperialistic ambitions of the Norman reigning house."

XIIth Century (second half)

Bouyges, Maurice (S. J.). AVERROÈS, *tafsir ma ba'd at-tabi'at*. Texte arabe inédit. Premier volume, livres petit alif, grand alif, ba', gim. VIII + 472 + 24 p. (Bibliotheca arabica scholasticorum, série arabe, t. V, 2). Beyrouth, Imprimerie Catholique, 1938. ISIS

Nous reparlerons de cette œuvre quand l'édition en sera plus avancée La présentation en est tout à fait admirable. G. S.

Holtsmark, Anne. En islandsk scholasticus fra det 12. århundre. 121 p. (Skrifter utgitt av Det Norske Videnskapsakademi i Oslo, II. Hist. Filos. Klasse, 3). Oslo, 1936. ISIS

Reviewed by A. H., *Isis* 29, 110, 1938.

Kagan, Solomon R. MAIMONIDES' prayer. *Annals of medical history* 10, 429-32, 1938. ISIS

Meyerhof, Max; Sobhy, G. P. The abridged version of " The Book of simple drugs " of AHMAD IBN MUHAMMAD AL-GHÂFIQÎ by GREGORIUS ABU-L-FARAG (BARHEBRAEUS). Edited from the only two known manuscripts, with an English translation, commentary and indices. Vol. I, fasc. III, letter dâl. p. 468-539 (p. 107-19, in Arabic). Cairo, Government Press, Bûlâq, 1938. ISIS

Continuation of the important publication begun in 1932. In my long review of it (*Isis* 20, 454-57), I wrote mistakenly (p. 456, l. 10) that GHÂFIQÎ died in 1264 instead of 1164. Please correct your copy ! G. S.

Somogyi, Joseph de. IBN AL-JAUZÎ's handbook on the Makkan pilgrimage. *Journal of the royal Asiatic society* 541-46, 1938. ISIS

Ünver, A. Süheyl. L'écrit du médecin en chef de l'hôpital Adudî de Bagdad 574 (1178). *Türk tib tarihi arkivi* 2, no. 7, 10, 1938. ISIS

XIIIth Century (whole and first half)

Welborn, Mary Catherine. Calendar reform in the thirteenth century. II + 33 p. University of Chicago libraries, 1935. ISIS

This thesis is mentioned very late, because the author failed to give me a copy of it, and I knew of its publication only recently by accident. G. S.

XIIIth Century (second half)

Coomaraswamy, Ananda K. Mediaeval aesthetic. II. ST. THOMAS AQUINAS on DIONYSIUS, and a note on the relation of beauty to truth. *Art bulletin* 20, 66-77, 1938. ISIS

Creutz, Rud. Die Medizin im Speculum maius des VINCENTIUS VON BEAUVAIS. *Archiv für Geschichte der Medizin* 31, 297-313, 1938. ISIS

Erlanger, Baron Rodolphe d' (1872-). La musique arabe. Tome troisième. ṢAFIYU-D-DÎN AL-URMAWÎ. I. *Aš-Šarafiyyah* ou Épître à ŠARAFU-D-DÎN. II. *Kitâb al-adwâr* ou Livre des cycles musicaux. Traduction française. XIV + 617 p. Paris, GEUTHNER, 1938. ISIS

Vols. I and II (1930-5) of this work were reviewed in *Isis* (20, 280-83; 26, 552). The author died many years ago but I have not yet found a single obituary devoted to him. Volume III contains the French translation of the very important treatise of ṢAFÎ AL-DÎN (d. 1294; see *Introduction* 2, 1034) with commentary by AL-JURJÂNÎ and a long preface by HENRY GEORGE FARMER. G. S.

Kurdian, H. A few corrections in the English translation and transliteration of the geography of GREGORY ABÛ'L FARAJ (BAR HEBRAEUS). *Journal of the royal Asiatic society*, 431, 1938. ISIS

Renaud, H. P. J. Notes critiques d'histoire des sciences chez les musulmans. Les IBN BÂṢO. *Hespéris* 12 p., Paris, 1937. ISIS

Apropos of an Escorial treatise on the astrolabe (673 = 1274) ascribed by CASIRI to one ḤUSAIN B. AḤMAD IBN MÂṢ AL-ASLAMÎ. I shall discuss this difficult question in vol. III of my *Introduction*. G. S.

Withington, Edward Theodore. ROGER BACON, on the errors of physicians. *Essays presented to* KARL SUDHOFF, p. 139-57, Zurich, 1924. ISIS

XIVth Century (whole and first half)

Matthews, Charles D. The " Kitâb bâ'ithu-n-nufûs " of IBNU-L-FIRKÂH. *Journal of the Palestine oriental society*, p. 284-93 plus 37 p. in Arabic, Jerusalem, 1935. ISIS

The Arabic text here given is that of a Moslem pilgrim's handbook for Palestine, first written over 600 years ago. The author died 1329 A. D. ... He is mainly concerned with the merits of a ' lesser pilgrimage ' to Jerusalem, and the rites there to be performed. But he also includes, in the final chapter, a like consideration of Hebron with its tombs of the Patriarchs, as well as references elsewhere to Bethlehem and other sacred places in Palestine, a holy land to Muslims no less than to Jews and Christians. The *bâ'ithu-n-nufûs* is an extract from two authors, IBN 'ASÂKIR and ABÛ-L-MA'ÂLÎ. The Arabic text covers 37 pages; it has apparently been edited with great care. G. S.

Renaud, H. P. J. IBN AL-BANNÂ de Marrakech, ṣûfî et mathématicien (XIIIe-XIVe S. J. C.). *Hespéris* 30 p., Paris, 1938. ISIS

Apropos of IBN AL-BANNÂ (1256-1321) dealt with in *Introd.* 2, 998-1000. I hope to come back to him in vol. 3 of the same work. The present study based on new Arabic sources is very important. G. S.

Sarton, George. *Query* no. 75. RAFAELE CANACCI, Florentine algebraist of the fourteenth century. *Isis* 29, 99, 1938. ISIS

Strycker, É. de. La baleine, l'aveugle et le chat dans un texte astrologique. *Revue belge de philologie et d'histoire* 17, 222-25, 1938. ISIS

Apropos of the PICARD translation of the *Liber Hermetis Trismegisti* discovered by W. GUNDEL, still unpublished. G. S.

Thorndike, Lynn. GUILLAUME DE GANDAVO. Humanisme et renaissance 5, 1 pl., 443, 1938. ISIS

Addition to WICKERSHEIMER's *Dictionnaire* (p. 243). WILLIAM OF GHENT practised medicine in Paris c. 1331. He is of no importance, and I will not deal with him in my *Introduction*. G. S.

Verlinden, Charles. La grande peste de 1348 en Espagne. *Rev. belge de philol. et d'histoire* 17, 103-46, 1938. ISIS

Youssouf, Kamal. Monumenta cartographica Africae et Aegypti. Tome 4, Époque des portulans suivie par l'époque des découvertes. Fasc. I, folios 1073-1177. Fasc. II, folios 1178-1290 (n. p., privately printed). ISIS

Reviewed by G. R. CRONE, *Geographical journal* 91, 558-59, 1938. "The following are reproduced for the first time : VESCONTE's Atlases of 1311 and 1320; PERRINUS VESCONTE's map of 1327; and a portion of the PIZIGANO chart of 1367." C. W. A.

XIVth Century (second half)

Crosby, Ruth. CHAUCER and the custom of oral delivery. *Speculum* 13, 413-32, 1938. ISIS

Robathan, Dorothy M. BOCCACCIO's accuracy as a scribe. *Speculum* 13, 458-60, 1938. ISIS

Sarton, George. *Query no.* 74. The mysterious arctic traveller of 1360, NICHOLAS OF LYNN? *Isis* 29, 98-99, 1938. ISIS

XVth Century (whole and first half)

Crone, G. R. The origin of the name *Antillia*. *Geographical journal* 91, 260-62, 1938. ISIS

Argues, with reproductions from charts, that *Antillia* was derived by a series of copyists' blunders, from *Getulia*, the classical name for the western region of Mediterranean Africa. C. W. A.

Kurdian, H. A few corrections on GUY LE STRANGE's "Clavijo, embassy to Tamerlane (1403-1406)." *Journal of the royal Asiatic society*, 555-60, 1938. ISIS

Winter, Heinrich. Notes on the Weimar portolan. *Geographical journal* 92, 150-52, 1938. ISIS

"To sum up my conclusions briefly: the above considerations forbid the superficial assumption that FREDUTIJS was the draughtsman of the Weimar chart. On the other hand, the name of FREDUTIJS fills in the gap in the legend as no other known name does. This however is not a reason for rejecting HUMBOLDT's dating of 1424. We may assume, until further evidence is forthcoming, that the chart is perhaps the work of an earlier member of the family, of whom nothing has been known." C. W. A.

XVth Century (second half)

Crone, G. R. The voyages of CADAMOSTO, and other documents on Western Africa in the second half of the fifteenth century. Translated and edited by G. R. CRONE. XLVI + 160 p. London, Hakluyt Society, 1937. ISIS

Reviewed by G. H. T. KIMBLE, *Geographical journal* 91, 556-57, 1938. The main text includes the narrative of PERO DE SINTRA's voyage: the other documents are ANTONIO MALFANTE's letter written at Touat in 1447, the narrative of DIOGO GOMES's voyages, and relevant extracts from BARROS's 'Decades.' C. W. A.

Partington, J. R. TRITHEMIUS and alchemy. *Ambix* 2, 53-9, 1938. ISIS

Read, John. Alchemy under JAMES IV of Scotland. *Ambix* 2, 60-7, 1938. ISIS

Vignal, L. Gautier. PIC DE LA MIRANDOLE. 261 p., pls. Paris, GRASSET, 1937 (30 fr.). ISIS

"Nous nous sommes appliqué, au cours de cette étude à situer PIC DE LA MIRANDOLE dans son milieu, à retracer les circonstances de sa vie et à le peindre lui-même, sans jamais rien avancer qui ne soit fondé sur des documents authentiques. Pour ce qui concerne sa philosophie, nous n'en avons indiqué que les données essentielles, afin de ne pas entraîner le lecteur dans des sujets qui réclament des études spéciales et que ne parviennent pas d'ailleurs à épuiser les plus vastes travaux."

XVIth Century (whole and first half)

B.—*Physical sciences and technology*

Fontoura da Costa, A. Quarto centenário da publicação do tratado da sphera, de PEDRO NUNES. *Petrus Nonius* 1, 337-56, 7 fig., 1938. ISIS

Elaborate study prepared to commemorate the fourth centenary of NUNES' great work. G. S.

Hartlaub, G. F. *Arcana artis.* Spuren alchemistischer Symbolik in der Kunst des 16. Jahrhunderts. *Zeitschrift für Kunstgeschichte* 6, 289-324, 1937. ISIS

Reviewed by J. R., *Ambix* 2, 112-13, 1938.

(Nonius, Petrus). Navios da Armada, com o nome "Pedro Nunes". *Petrus Nonius* 1, 479-83, 4 fig., 1938. ISIS

History of the Portuguese men of war named after NUNES. G. S.

C.—*Natural sciences*

Kammerer, F. Albert. The LOPO HOMEM map once more. *Geographical journal* 91, 450-53, 1938. ISIS

Rossiter, Henry Preston. Gift of FUCHS' herbal. *Bulletin of the Museum of fine arts*, 36, 57-60, ill., Boston 1938. ISIS

Apropos of the acquisition of a copy of LEONARD FUCHS, *De historia stirpium* (Basel 1542). G. S.

D.—*Medical sciences*

Allendy, René. PARACELSE, le médecin maudit. Troisième édition. 199 p. Paris, GALLIMARD, 1937 (24 fr.). ISIS

Pina, Luiz de. Contribuição dos Portugueses quinhentistas para a história da medicina do oriente. *Petrus Nonius* 1, 380-404, 1938. ISIS

Schmutzer, Richard. Die Initialen in VESALS Anatomie. *Archiv für Geschichte der Medizin* 31, 328-30, 1938. ISIS

Spencer, W. G. The "epitome" of VESALIUS on vellum in the British Museum library. *Essays presented to* KARL SUDHOFF, p. 237-44, 9 fig., Zurich, 1924. ISIS

Uhlig, Paul. Auf der Suche nach Stadtärzten. Zwickauer Ratsprotokolle berichten. *Archiv für Geschichte der Medizin* 31, 330-36, 1938. ISIS

E.—*Alia*

Allen, Percy Stafford (1869-1933). Opvs epistolarvm DES. ERASMI Roterodami. Denvo recognitvm et avctvm per P. S. ALLEN. Tom. IX, 1530-1532. Edidervnt H. M. ALLEN et H. W. GARROD. XXIV + 497 p., 3 pl. Oxford, Clarendon Press, 1938. ISIS

" This volume is in large part the work of P. S. ALLEN. He collected letters and arranged them provisionally in order of date : only a few have had to be shifted as further facts came to light. He collated all the MSS. and himself copied those more difficult to decipher. The hurried notes of BERNARD OF CLES, the seemingly illegible rough-drafts of BONIFACE AMERBACH, and the hastily written letters of ERASMUS himself in the Copenhagen MS. were copied with such neatness and precision that it is possible to send them straight to the printers." For previous volumes see *Isis* 27, 418. G. S.

Goetz, Hermann. An antagonist of the Portuguese in the Indian Ocean. A contemporary painting representing the Mameluke Sultan KANSUWAH AL-GHURY. *Journal of Indian history*, Madras 16, 169-74, 1 pl., 1937. ISIS

A painting of the school of BELLINI (CATENA or MANSUETI ?) showing the Venetian embassy of DOMENICO TREVISANO to Cairo in 1512. It is the only existing portrait of a Mameluke sultan; the fleets of KANSUWAH AL-GHURY fought with the Portuguese in 1503-1513. From a comparison of this painting with the works of VITTORE CARPACCIO it is evident that —contrary to the opinion of MOLMENTI—CARPACCIO must really have been in Palestine and is to be regarded as a reliable source for contemporary Mameluke civilization.

XVIth Century (second half)

A.—*Mathematics*

Hope-Jones, W. LUDOLPH (or LUDOLFF or LUCIUS) VAN CEULEN. *Mathematical gazette* 22, 281-82, 1938. ISIS

In the archives of St. Pieter's Kerk in Leiden, an epitaph is recorded of LUDOLFF VAN CEULEN (1540-1610) which includes his value of π to 34 places of decimals. But a search for the tombstone indicates that it has been broken up. C. W. A.

B.—*Physical sciences and technology*

Michel, Henri. L'anneau astronomique de MOTTER de l'Observatoire royal de Belgique. *Ciel et terre* 54, 80-6, 1938. ISIS

Michel, Henri. Un astrolabe d'ERASME HABERMEL. *Bull. de la société royale d'archéologie de Bruxelles*, 107-10, août-décembre 1937. ISIS

C.—*Natural sciences*

Livett, Grevile M. Early Kent maps (sixteenth century). Reprinted from *Archaeologia cantiana* 49, 1937. 31 p., 1938. ISIS

Reviewed by E. HEAWOOD, *Geographical journal* 92, 158-60, 1938. Four earliest known maps : by ROBERT GLOVER 1571, by SAXTON 1575, an anonymous map based on last, and one by SYMONSON 1596. C. W. A.

Williamson, James A. DRAKE's plate of brass. *Geographical journal* 91, 543-45, 1938. ISIS

Concerning the identity of the brass plate picked up at Corte Madera Creek in 1936, with the plate set up by DRAKE in 1579. C. W. A.

D.—*Medical sciences*

Draper, John W. The melancholy Duke ORSINO. *Bulletin of the institute of the history of medicine* 6, 1020-29, 1938. ISIS

Méndez Trongé, Miguel F. Higiene y condiciones sanitarias en la expedición de ORTIZ DE ZÁRATE. *Publicaciones de la cátedra de historia de la medicina* 1, 253-73, Buenos Aires, 1938. ISIS

E.—*Alia*

Bradbrook, M. C. The school of night : a study of the literary relationships of Sir WALTER RALEGH. VIII + 190 p. Cambridge, University Press, 1936. ISIS

Reviewed by FRANCIS R. JOHNSON, *Isis* 29, 113-15, 1938.

Ventura, Augusta Faria Gersão. O " Vespero " dos Lusíadas, III, 115 e a " Amorosa strella " de VI, 85. *Petrus Nonius* 1, 405-06, 1938. ISIS

XVIIth Century (whole and first half)

A.—*Mathematics*

Loria, Gino. Le prétendu " larcin " de TORRICELLI. *Archeion* 21, 62-8, 1938. ISIS

Refutation of PASCAL's erroneous statement in 1658, accusing TORRICELLI of having stolen ROBERVAL's measurement of the area of the cycloid. G. S.

Pelseneer, Jean. DESCARTES et le théorème de POINCARÉ (à propos de la question des précurseurs). *Isis* 29, 24-8, 1938. ISIS

Saltykow, N. *La Géométrie de* DESCARTES. *Bull. des sc. math.* 62, 83-96, 110-23, 1938. ISIS

Saltykow, N. Souvenirs concernant le géomètre yougoslave MARINUS GHETALDI, conservés à Doubrovnik, en Dalmatie. *Isis* 29, 20-3, 1 pl., 1938. ISIS

B.—*Physical sciences and technology*

Bishop, Morris. PASCAL, the life of genius. XI + 398 p., 6 pl. Baltimore, WILLIAMS & WILKINS, 1936. ISIS

Reviewed by E. C. WATSON, *Isis* 29, 116-18, 1938.

Davis, Tenney L. Count MICHAEL MAIER's use of the symbolism of alchemy. *Journal of chemical education* 15, 403-10, 11 fig., 1938. ISIS

Galileo Galilei. Opere a cura di SEB. TIMPANARO. 2 vols. 1078 p., 9 pl.; 877 p., 12 pl. Milano, RIZZOLI, 1936-8 (lire 100). ISIS

" I classici Rizzoli " is a collection of some 60 thick volumes beautifully printed on thin paper, containing the masterpieces of Italian literature. It was an excellent idea to devote two volumes to GALILEO, who was in his scientific writings (not in the others) one of the greatest Italian authors, and who is one of the greatest writers among men of science of all times and places. This selection carefully edited by TIMPANARO does not replace of course the magnificent national edition prepared by FAVARO. However, the majority of scholars have no access to the FAVARO edition, or at any rate they cannot have it close at hand on their own shelves. The RIZZOLI edition contains in vol. I the *Dialogo dei massimi sistemi* (605 p.), plus a series of other writings, and a Galilean chronology, so elaborate that it includes the text of a number of documents (e.g., sentence of the inquisition 1633).

Vol. II contains the *Dialoghi delle nuove scienze*, and *Il saggiatore*, to which the editor has added a few other documents. There are a number of interesting illustrations and the printing is beautifully done. G. S.

Gregory, Joshua C. Chemistry and alchemy in the natural philosophy of SIR FRANCIS BACON, 1561-1626. *Ambix* 2, 93-111, 1938. ISIS

Humbert, Pierre. La détermination des coordonnées géographiques au début de 17e siècle. *Ciel et terre*, 233-38, 1938. ISIS

Jenkins, Rhys. The heat engine idea in the seventeenth century. A contribution to the history of the steam engine. *Transactions of the Newcomen society* 17, 1936-37, 1-11, 1938. ISIS

Lemay, P. JEAN REY, précurseur de TORRICELLI, PASCAL et LAVOISIER. *Bulletin de la société française d'histoire de la médecine* 32, 148-63, 1938. ISIS

McColley, Grant. *The Defense of Galileo* of THOMAS CAMPANELLA. For the first time translated and edited, with introduction and notes. Smith College studies in history 22, XLIV + 93 p., 1937. ISIS

" The *Defense of Galileo* was composed by CAMPANELLA in a Neapolitan dungeon during the year 1616, and was published at Frankfort in 1622 under the supervision of TOBIA ADAMI. It is a courageous and vibrant apology for freedom of investigation, for Copernican astronomy, and for the scientific method of the Florentine. CAMPANELLA challenges directly and in detail the major arguments which a powerful and determined ecclesiastical opposition had brought against the new philosophy, and demonstrates that these arguments are without adequate foundation." ... " The specific occasion which brought forth the *Defense* was the concerted attack upon both GALILEO and heliocentric astronomy which developed rapidly following the *Sidereus Nuncius* or *Starry Messenger*, and culminated in proscription of the Copernican hypothesis. The initial step in the campaign of obscurantism was taken in May, 1611, when the Holy Office placed the name of GALILEO on its list of suspects. Two years later the newly elected professor of mathematics at Pisa, BENEDETTO CASTELLI, was warned not to advocate the Copernican theory. By 1615 professional enemies and over-zealous churchmen had driven GALILEO to declare that every conceivable method of attack had been employed to discredit and ruin him. In December of this year he was interrogated by the Inquisition at Rome, and ordered to renounce the Copernican hypothesis. Apparently doubtful of the efficacy of private admonitions, Cardinal BELLARMINE prepared early in 1616 for ecclesiastical proscription of heliocentric astronomy. When word of this pending misfortune reached CAMPANELLA in his prison cell, he at once composed his spirited defense of GALILEO and the new philosophy. But the Holy Office has determined to act, and his plea, if heard, was not

considered. On 25 February, 1616, the Sacred Congregation of the Catholic Church officially condemned the *Revolutions* of COPERNICUS and Copernican astronomy. On 5 March, the condemnation was formally announced, and printed copies prepared for distribution. The *Defense of Galileo* was brought forth by an immediate and specific event, but the work is best understood against the background of the several movements with which it was intimately connected. It will be of interest to survey briefly the life, contributions, and character of CAMPANELLA, together with the problems occasioned both by the nature and the growing prestige of heliocentric astronomy. The *Defense* itself played a significant part in the contemporary conflict over the authority in science of Scripture, and was linked with three important and closely allied movements : the emergence of modern empirical epistemology, the development of the idea of intellectual progress, and the controversy between ' Ancients and moderns.' For perhaps a half century after its publication, CAMPANELLA's treatise was read by educated men throughout Europe, and to such intellectual and spiritual leaders as Bishops JOHN WILKINS and JOHN AMOS COMENIUS, the *Apologia pro Galileo* gave a full measure of inspiration and encouragement."

Pascal, Blaise. The physical treatises of PASCAL : The equilibrium of liquids and the weight of the mass of the air. Translated by I. H. B. and A. G. H. SPIERS with introduction and notes by FREDERICK BARRY. XXVIII + 181 p., 3 pl. (Records of civilization, sources and studies, Columbia University, no. 28). New York, Columbia University Press, 1937. ISIS

Reviewed by E. C. WATSON, *Isis* 29, 116-18, 1938.

Sleeper, Helen Joy. The alchemical fugues in Count MICHAEL MAIER's *Atalanta fugiens*. *Journal of chemical education* 15, 410-15, 4 fig., 1938. ISIS

C.—*Natural sciences*

Eddelbüttel, Heinrich. In Rostock zur Zeit des Dreissigjährigen Krieges vorkommende Heilkräuter und Zierpflanzen der Gärten. II Teil, Schluss. *Archiv für Geschichte der Medizin* 31, 121-47, 1938. ISIS

D.—*Medical sciences*

Klebs, Arnold C. L'iconographie de THÉODORE TURQUET de Mayerne. *Genava, Bulletin du musée d'art et d'histoire de Genève* 16, 173-76, 1 pl., 1938. ISIS

Major, Ralph H. SANTORIO SANTORIO. *Annals of medical history* 10, 369-81, 13 fig., 1938. ISIS

Rolleston, Sir Humphry. The reception of HARVEY's doctrine of the circulation of the blood in England as exhibited in the writings of two contemporaries. *Essays presented to* KARL SUDHOFF, p. 247-54, Zurich, 1924. ISIS

E.—*Alia*

Fulton, John F. Sir KENELM DIGBY. 75 p. New York, PETER and OLIVER, 1937. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 29, 118, 1938.

Goetz, Hermann. An Indian element in 17th century Dutch art. *Oud-Holland*, pt. 5, 54, 222-30, 7 ill., Amsterdam, 1937. ISIS

The influence of Malabar paintings and ethnographical objects on the art of PIETER LASTMAN, the teacher of REMBRANDT. The Indian parasol as a milieu accessory in the Oriental scenes of REMBRANDT and his school. Appendix : A (theatre) diadem to be seen in 16th century Flemish and Dutch paintings, introduced into Western fashion from the Near East; its origin goes back to India, via Persia and the Buddhist mission amongst the Central Asian tribes later on converted to Islam.

Rostenne, Paul. La conception pascalienne de l' " abêtissement." *Rev. belge de philol. et d'hist.* 16, 561-76, 1937. ISIS

Tannery, Marie. La correspondance de MERSENNE (à propos du III[e] volume de cette publication). *Archeion* 21, 97-9, 1938. ISIS

XVIIth Century (second half)

A.—*Mathematics*

Barbensi, Gustavo. Di una diversa soluzione di un problema di meccanica muscolare da parte di due medici matematici. *Rivista di storia delle scienze mediche* 29, 168-80, 1938. ISIS

Apropos of GIAN ALFONSO BORELLI (1608-79) and JOHANN BERNOULLI (1667-1748).

Hofmann, Jof. E. NICOLAUS MERCATORS logarithmotechnia (1668). *Deutsche Mathematik* 3, 446-66, 1938. ISIS

Mouy, Paul. MALEBRANCHE et NEWTON. *Rev. de mét. et de mor.* 411-35, 1938. ISIS

Turnbull, H. W. JAMES GREGORY (1638-1675). *Nature* 142, 57-8, 1938. ISIS

B.—*Physical sciences and technology*

Leonard, Irving A. Ensayo bibliográfico de SIGÜENZA Y GÓNGORA. x + 65 p. Monografias bibliográficas mexicanas, 15. 1929. ISIS

Among the writings of CARLOS DE SIGÜENZA Y GÓNGORA (d. 1700) are the " Libra astronómica y philosóphica " (Mexico 1691) written against father EUSEBIO FRANCISCO KINO (S. J.) : Exposición astronómica del cometa del año 1681 (Mexico 1681). My attention was attracted to this by the beautiful book of H. E. BOLTON : Rim of Christendom (New York 1936; *Isis* 29, 116). In ASHLEY-MONTAGU's review of it the date of KINO's treatise is wrongly given as 1718, instead of 1681. G. S.

Sergescu, P. Comment on devenait ingénieur en 1690. *Sphinx* 109-10, 1938. ISIS

C.—*Natural sciences*

Chance, Burton. Sketches of the life and interests of Sir HANS SLOANE : naturalist, physician, collector and benefactor. *Annals of medical history* 10, 390-404, 7 fig., 1938. ISIS

Parker, G. H. A spurious portrait of SWAMMERDAM. *Quarterly review of biology* 12, 206-09, 1937. ISIS

J. STOLKER's portrait of SWAMMERDAM derived from one of the heads in REMBRANDT's "Anatomy Lesson of Dr. Tulp" and frequently reproduced is spurious. G. S.

Schrecker, Paul. MALEBRANCHE et le préformisme biologique. *Revue internationale de philosophie* 1, 77-97, 1938. ISIS

" La biologie de MALEBRANCHE est un chapitre de sa doctrine scientifique, qui n'a pas encore été étudié jusqu'à ce jour avec toute l'attention qu'il mériterait, tant par le rôle qu'il a joué dans l'histoire de cette science que par la fonction capitale qu'il remplit dans l'ensemble du système philosophique et théologique. En effet, les explications que l'oratorien a proposées de la génération, de la propagation des espèces et de l'hérédité forment non seulement un système cohérent de biologie, mais ce système est d'une originalité incontestable et anticipe largement sur le développement postérieur qui lui doit un grand nombre de conceptions fondamentales et fécondes."

D.—*Medical sciences*

Friedman, Reuben. CAROLUS MUSITANUS, the 250th anniversary of his contribution to scabies. *Medical life* 45, 177-87, 1938. ISIS

Siewers, Albert B. A case of madness cured by blood transfusion. *Bulletin of the institute of the history of medicine* 6, 1010-14, 1938. ISIS

Ünver, A. Süheyl. Les idées du médecin turc CHABAN CHIFAI et de EUMER HAYYAM. *Türk tib tarihi arkivi* 3, 16-17, 1938. ISIS

Van der Hoeven, J. ALBERTUS DE LA HAYE, med. doctor (1655-1774). *Bijdragen tot de geschiedenis der geneeskunde* 18, 151-52, 1 pl., 1938. ISIS

E.—*Alia*

Bolton, Herbert Eugene. Rim of Christendom. XV + 644 p. New York, MACMILLAN, 1936. ISIS

Biography of Father EUSEBIO FRANCISCO KINO (1645-1711). Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 29, 116, 1938.

Clark, G. N. Science and social welfare in the age of NEWTON. 159 p. Oxford, Clarendon Press, 1937. ISIS

Reviewed by R. K. MERTON, *Isis* 29, 119-21, 1938.

Mendels, Judica I. H. HOLGER JACOBAEUS' reizen in Holland. *Bijdragen tot de geschiedenis der geneeskunde* 18, 153-67, 7 fig., 1938. ISIS

Mullett, Charles F. A letter by JOSEPH GLANVILL on the future state. *Huntington library quarterly* 1, 447-56, 1938. ISIS

XVIIIth Century (whole and first half)

B.—*Physical sciences and technology*

Bianchi, Emilio. Commemorazione dell'astronomo dalmata RUGGERO GIUSEPPE BOSCOVICH (1711-87). *Contributi della R. Specola di Brera-Milano*, no. 37, 12 p. ISIS

Brunet, Pierre. ROGER JOSEPH BOSCOVICH. *Archeion* 21, 102, 1938. ISIS

Raistrick, Arthur. The steam engine on Tyneside, 1715-1778. *Transactions of the Newcomen society* 17, 1936-37, p. 131-63, 1 fig., 1938. ISIS

Schiaparelli, G. V.; Boscovich, R. G. Sull' attivita del BOSCOVICH quale astronomo in Milano. 30 p. Carteggio con corrispondenti diversi. 120 p. *Pubblicazioni del R. Osservatorio astronomico di Milano-Merate*, nuova serie, no. 2, 1, 1938. ISIS

C.—*Natural sciences*

Lütjeharms, W. J. Zur Geschichte der Mykologie : Das XVIII. Jahrhundert. IV + 262 p., 2 pl. (Mededeelingen van de Nederlandsche Mycologische Vereeniging, 23). Couda, N. V. Drukkerij, 1936. ISIS

Not seen and, I understand, no longer available. G. S.

D.—*Medical sciences*

Boerhaave, Herman (1668-1738). *Bijdragen tot de geschiedenis der geneeskunde* 18, 173-280, pls., 1938. ISIS

Whole number devoted to BOERHAAVE apropos of the bicentenary of his death, richly illustrated. Containing articles by D. SCHOUTE, HENRY E. SIGERIST, J. D. COMRIE, I. FISCHER, H. UITTIEN, PAUL DIEPGEN, J. F. FULTON, EDMUND O. VON LIPPMANN, ARTURO CASTIGLIONI, T. A. SPRAGUE, C. P. J. PENNING, K. F. WENCKEBACH, G. VAN RIJNBERK and E. SLUITER, PH. L. M. M. TAMINIAU, and J. E. SCHULTE. G. S.

Cohen, Ernst; Cohen-de Meester, W. A. T. Teruggevonden manuscripten en briefwisselingen van HERMAN BOERHAAVE. *Bijdragen tot de geschiedenis der geneeskunde* 18, 147-50, 1 pl., 1938. ISIS

Cornog, William H. Sir SAMUEL GARTH, a court physician of the 18th century. *Isis* 29, 29-42, 1938. ISIS

Jameson, Edwin M. Eighteenth century obstetrics and obstetricians in the United States. *Annals of medical history* 10, 413-28, 1 fig., 1938. ISIS

Jezewski, Käthe von. JOHANN GEORG KEYSSLER (1693-1743) schildert italienische Hospitäler. *Archiv für Geschichte der Medizin* 31, 317-27, 1938. ISIS

Petersen, Christine E. The doctor in French drama, 1700-1775. 142 p. New York, Columbia University press, 1938 ($ 2.25). ISIS

" Through the medium of the French dramatists, we see how the doctor changed from the pedantic and solemn doctor of the *Commedia dell'arte*

and of MOLIÈRE's plays to a coquettish fop. We learn of the petty jealousies between the doctors and of the spectacular quarrels between the physicians and surgeons. At the same time, the plays depict the contemporary state of medicine and, by their jovial and searching criticisms, shed much light on the history of medicine. Contents : 1. Introduction; 2. Doctors of the *Commedia dell'arte* type; 3. Molièresque types and jokes; 4. The quarrel of the faculties; 5. Quacks and faddists; 6. Society doctors; 7. The doctor off the stage; Chronology of plays containing medical characters or medical references; Sources cited; Index."

Renaud, H. P. J. Un " colossal " anachronisme de FREIND. (A propos de l'article de Mr. PHILIP SHORR, *Isis* 27, 453-74, 1937). *Isis* 29, 100, 1938. ISIS

Schoute, D. HERMAN BOERHAAVE. Commemorative speech delivered in the Aula of the Leyden University hospital on Friday, 23rd September 1938. 20 p. (mimeographed). ISIS

Waring, Joseph Ioor. JAMES KILLPATRICK and smallpox inoculation in Charlestown. *Annals of medical history* 10, 301-08, 3 fig., 1938. ISIS

XVIIIth Century (second half)

A.—*Mathematics*

Du Pré, A. Mason, jr. The first table of the normal probability integral : its use by KRAMP, who constructed it. *Isis* 29, 43-8, 1938. ISIS

Popa, Ilie I. Le modèle italien d'un ancien traité roumain d'arithmétique. *Archeion* 69-73, 1938. ISIS

Apropos of the Rumanian bishop AMFILOHIE HOTINIUL, who published various scientific textbooks, e.g., an arithmetic (Iaşi 1795) derived from the *Elementi aritmetici* of ALESSANDRO CONTI (5 Italian editions 1730-80). G. S.

B.—*Physical sciences and technology*

Cabanes, Charles. JOSEPH DE MONTGOLFIER et le bélier hydraulique. *Transactions of the Newcomen society* 17, 1936-37, p. 85-90, 1938. ISIS

Dickinson, H. W. Early years of the hydraulic ram. *Transactions of the Newcomen society* 17, 1936-37, p. 73-83, 3 fig., 1938. ISIS

Hamilton, Stanley B. CHARLES AUGUSTE DE COULOMB : a bicentenary appreciation of a pioneer in the science of construction. *Transactions of the Newcomen society* 17, 1936-37, p. 27-49, 13 fig., 1938. ISIS

Lewton, F. L. Historical notes on the cotton gin. *Annual report of the Smithsonian Institution for the year ending June* 30, 1937, p. 549-63, 4 pl., 1938. ISIS

Lippman, Edmund O. von. Aus den ersten Anfängen der Rübenzucker-Industrie. *Die Deutsche Zuckerindustrie* Nr. 41, 980, 1938. ISIS

Ocagne, Maurice d'. LAVOISIER, père de la chimie moderne. *Rev. scientifique* 361-66, 1938. ISIS

Telford, Thomas (1757-1834). On mills. Edited by E. LANCASTER BURNE. *Transactions of the Newcomen society* 17, 1936-37, p. 205-14, 1938. ISIS

Thomas, John. JOSIAH WEDGWOOD as a pioneer of steam power in the pottery industry. *Transactions of the Newcomen society* 17, 1936-37, p. 13-25, 2 fig., 1938. ISIS

C.—*Natural sciences*

Castaldi, Luigi. A l'occasion du deuxième centenaire de LUIGI GALVANI. *La presse médicale*, 18 décembre 1937, 1844-48. ISIS

Biographie avec de nombreuses reproductions photographiques de mémoires de GALVANI. L. L.

Lacroix, Alfred. Une famille de bons serviteurs de l'Académie des sciences et du Jardin des plantes, Les LUCAS. *Bulletin du muséum national d'histoire naturelle* 10, 446-71, 1938. ISIS

" Je veux appeler ici l'attention sur une famille, celle des LUCAS qui, sur un plan modeste, a fourni, pendant cent ans, des serviteurs dévoués et méritants à l'Académie des Sciences et au Jardin des Plantes et dont l'activité s'est prolongée au Muséum d'Histoire Naturelle pendant encore près de trois quarts de siècle."

D.—*Medical sciences*

Claro, Alberto. Un caso de ética profesional en 1772. *Publicaciones de la cátedra de historia de la medicina* 1, 275-78, Buenos Aires, 1938. ISIS

Gibson, James E. Captured medical men and army hospitals of the American revolution. *Annals of medical history* 10, 382-89, 1938. ISIS

Hartenstein, Johannes G. GEORG CHRISTIAN REICHEL (1727-1771) GOETHES Leipziger Arzt und Grossonkel von C. G. CARUS. *Archiv für Geschichte der Medizin* 31, 188-200, 1938. ISIS

Monteiro, Arlindo Camilo. Les doctrines médicales de WILLIAM CULLEN et de JOHN BROWN en Portugal et en Espagne. Esquisse de leur expansion. 72 + XXXIII p., Lisboa, (received August 1938). ISIS

Elaborate study of the Portuguese and Spanish repercussions of the teaching of the great Scotch leaders, WILLIAM CULLEN (1710-90) and JOHN BROWN (1735-88). G. S.

Rouffiandis, Dr. Le chancelier IMBERT de l'Université de médecine de Montpellier, inspecteur des hôpitaux militaires, et de ce qu'il advint à la suite de deux de ses inspections à Perpignan. *Bulletin de la société française d'histoire de la médecine* 32, 170-77, 1938. ISIS

Rückert, Oskar E. Bericht aus Unna i.W. über die Pflege eines verwundeten französischen Kriegsgefangenen im Siebenjährigen Kriege (1758). *Archiv für Geschichte der Medizin* 31, 313-16, 1938. ISIS

Wall, Cecil. The history of the Surgeons' Company, 1745-1800. 256 p., 10 pl. London, HUTCHINSON, 1937. ISIS

Reviewed by JOHN B. DE C. M. SAUNDERS, *Isis* 29, 121-23, 1938.

E.—*Alia*

Alonso, Aurelia. Fundación de la casa de expósitos. *Publicaciones de la cátedra de historia de la medicina* 1, 199-217, Buenos Aires, 1938. ISIS

Dehérain, Henri. Orientalistes et antiquaires. SILVESTRE DE SACY, ses contemporains et ses disciples. XXXIII + 69 p., frontispiece. (Haut-commissariat de la République française en Syrie et au Liban, service des antiquités, bibliothèque archéologique et historique, 27). Paris, GEUTHNER, 1938. ISIS

Falls, William F. BUFFON, FRANKLIN, et deux académies américaines. *Romanic review* 37-47, Feb. 1938. ISIS

Holmberg, Arne. Die Abschriftensammlung des Geschichtsforschers BENGT BERGIUS (1723-1784) in der Königl. Schwedischen Akademie der Wissenschaften. Systematisches Verzeichnis. XII + 138 p. (Kungl. Bibliotekets Handlingar, Bilagor, ny följd 4), Stockholm 1938 (in Swedish). ISIS

Mieli, Aldo. L'historien (!) SAVÉRIEN connaissait-il les choses dont il parlait? *Archeion* 21, 105-08, 1938. ISIS

Reproducing G. H. F. NESSELMANN's devastating criticism of SAVÉRIEN's *Histoire des progrès de l'esprit humain* (1766).

Streletzki, C. DU PONT DE NEMOURS (1739-1817). *La presse médicale*, 202-05, 6 février 1937. ISIS

La figure de PIERRE SAMUEL DU PONT DE NEMOURS est peu connue. Cependant cet homme doit être placé parmi les fondateurs de l'économie politique. Il fut l'un des principaux vulgarisateurs des théories de QUESNAY, le collaborateur de TURGOT, le conseiller de VERGENNES. L'auteur en fait une étude physiognomonique et graphologique. L. L.

XIXth Century (whole and first half)

A.—*Mathematics*

Bell, Eric T. Father and son, WOLFGANG and JOHANN BOLYAI. *Scripta mathematica* 5, 37-44, 95-100, 1938. ISIS

Bell, Eric T. The history of BLISSARD's symbolic method, with a sketch of its inventor's life. *American mathematical monthly* 45, 414-21, 1938. ISIS

B.—*Physical sciences and technology*

Dony-Hénault, Oct. A propos de la découverte de la métallurgie thermique du zinc en Belgique au début du XIX^{e} siècle. Documents oubliés. *Acad. R. de Belgique, Bull. de la cl. des sc.* 24, 84-7, 397-99, 1938. ISIS

Apropos du chanoine J. J. D. DONY créateur de l'industrie thermique du zinc. G. S.

Farey diary, the. 1819. Annotated by HARRISON W. CRAVER, H. W. DICKINSON, and RHYS JENKINS. *Transactions of the Newcomen society* 17, 1936-37, p. 215-19, 1938. ISIS

Prandtl, Wilhelm. FRAUNHOFER und DAGUERRE. Zwei Bildnisse. Zur Jahrhundertfeier der Photographie. 15 p. München 1939 (received Nov. 1938). ISIS

" FRAUNHOFER und DAGUERRE—was haben die beiden miteinander gemeinsam, der bescheidene gelehrte Techniker, dessen grosse Leistungen einer seltenen Begabung und ungeheurer Arbeitskraft entsprangen, und der heitere, lebenslustige, aber auch eitle Künstler, dem bei mässiger Begabung durch eine Reihe von glücklichen Umständen und geschickte Geschäftsgebarung eine der folgenschwersten Erfindungen zufiel? Nichts als den Erfolg auf dem Gebiete der Optik, indem sie zeigten, der eine, wie man richtige Bilder erzielt, der andere, wie man sie festhält. Während wir den einen zu den grössten Naturforschern aller Zeiten rechnen, können wir den andern kaum einen Naturforscher nennen. Und doch hatte DAGUERRES Arbeit die weite-tragenden Folgen : seine Erfindung erst krönte das Werk FRAUNHOFERS."

Speter, Max. Der sog. " Pfaff, " alias " Wolf-Gegenstromauftriebs-kühler " noch 1814-1830 nachweisbar. *Zeitschrift f. Spiritusindustrie* 61, 271, 2 fig., 1938. ISIS

Speter, Max. " Die chemischen Feuerzeuge mit Zündhölzern und ihre Verfertigung " (1816). *Deutsche Zündwaren-Zeitung* Nr. 7, S. 50, 1938. ISIS

Speter, Max. Von PISTORIUS' bzw. BUGGE's Brennapparatur 1816-17 bzw. 1817-22. *Zeitschr. f. Spiritusindustrie* 61, 318-20, 2 fig., 1938. ISIS

Weeks, Mary Elvira. NILS GABRIEL SEFSTRÖM, the sesquicentennial of his birth. *Isis* 29, 49-57, 2 pl., 1938. ISIS

C.—*Natural sciences*

Geiser, Samuel Wood. Naturalists of the frontier. With a foreword by HERBERT SPENCER JENNINGS. 341 p., port., 10 fig. Dallas, Texas, Southern Methodist Univ. Press, 1937. ISIS

Reviewed by CHARLES A. KOFOID, *Isis* 29, 129-32, 1938.

Mazuel, Jean. L'œuvre géographique de LINANT DE BELLEFONDS : étude de géographie historique. XXIV + 400 + XXXII p. Le Caire, Société royale de géographie d'Égypte, 1937. ISIS

Reviewed by G. O. W., *Geographical journal* 91, 390-91, 1938.

Robinson, Solon. Pioneer and agriculturist. Selected writings edited by H. A. KELLAR. 2 vols., 1138 p., ill. Indianapolis, Indiana historical survey, 1936. ISIS

Reviewed by R. C. BENEDICT, *Journal of the New York Botanical Garden* 39, 93, 1938.

Sarton, George. GEORGE CATLIN, "Indian-loving CATLIN" (1796-1872). A footnote to SARTON's article on him (*Isis* 22, 77-89, 4 fig., 1934). *Isis* 29, 101, 1938. ISIS

Schmid, Günther. Aus der Frühgeschichte des botanischen Gartens in München. *Archiv für Geschichte der Medizin* 31, 148-64, 1938. ISIS

D.—*Medical sciences*

Baer, K. E. von. De morbis inter Esthonos endemicis. Herausgegeben von HEINZ ZEISS. 130 p. Stuttgart, ENKE, 1938 (Rm. 3). ISIS

Reprint of BAER's doctroral thesis prepared under the direction of DANIEL GEORG BALK in Dorpat and published in Dorpat 1814. BAER being born in Esthonia has made a study of the diseases endemic in his country, the first of its kind. Introduction by HEINZ ZEISS of Berlin. May I recall that a facsimile of BAER's more famous work the *De ovi mammalium et hominis genesi* (Leipzig 1827) was published in *Isis* (vol. 16, 315-78, 1931) together with a long introduction "The discovery of the mammalian egg and the foundation of modern embryology." G. S.

Callomon, Fritz. Aus der Autographenmappe eines Arztes. Unbekannte und unveröffentlichte Briefe und Dokumente berühmter Ärzte und Naturforscher, erläutert und besprochen. *Janus* 42, 89-116, 3 pl., 1938. ISIS

Apropos of autographs of CH. W. HUFELAND (1762-1836), J. CHR. LODER (1753-1832), JOHANNES MÜLLER (1801-58).

Ebstein, Erich. FRANZ JOSEPH GALL im Kampf um seine Lehre auf Grund unbekannter Briefe an BERTUCH usw. sowie im Urteile seiner Zeitgenossen. *Essays presented to* KARL SUDHOFF, p. 269-322, 2 port., Zurich, 1924. ISIS

Guglielmini, Tito. La vita scientifica e patriottica di MAURO RUSCONI medico pavese (1776-1849). *Rivista di storia delle scienze mediche* 29, 181-82, 1938. ISIS

Henle, Jacob. On miasmata and contagia. Translated with an introduction by GEORGE ROSEN. 77 p., port. Baltimore, Johns Hopkins press, 1938 ($ 1). ISIS

"A little less than one hundred years ago—in 1840—the 'Pathologische Untersuchungen' of JACOB HENLE was published in Berlin. This work, whose author was then 31 years old and had just entered upon his duties as professor of anatomy at Zürich, is a landmark in the history of medicine in general and of infectious diseases in particular. It possesses this significance because of the first paper contained in the volume and entitled *Von den Miasmen und Kontagien*, concerning miasmata and contagia. However, unlike other important medical contributions, this paper does not contain a single new discovery. Its significance lies in the fact that in this essay HENLE formulated, on the basis of deductive considerations, his firm conviction that Contagia animata, i.e. living organisms were the cause of contagious and infectious diseases."

Kaschade, R. CHARLOTTE HEIDENREICH-VON SIEBOLD. Die erste Frauenärztin Deutschlands. *Janus* 42, 185-88, 1938. ISIS

Rouffiandis, Dr. Commémoration du centenaire de la mort de DESGENETTES (18 décembre 1937). *Bulletin de la société française d'histoire de la médecine* 32, 130-47, 1938. ISIS

Ünver, A. Süheyl. Ein schwedisch-norwegischer Arzt in Beyruth im Jahre 1830. *Türk tib tarihi arkivi* 3, 31-3, 1938. ISIS

Apropos of JOHAN HEDENBURG.

Ünver, A. Süheyl. Un document de l'histoire de la médecine roumaine. *Türk tib tarihi arkivi* 3, 27-9, 1938. ISIS

Zeiss, Heinz. Deutsche Ärzte in Russland. 1. JOHANN PETER FRANK; 2. CHRISTIAN WILHELM SCHMID. *Archiv für Geschichte der Medizin* 31, 219-46, 1938. ISIS

E.—*Alia*

Armstrong-Jones, Sir Robert. Some remarks on KEATS and his friends. *Annals of medical history* 10, 433-44, 3 fig., 1938. ISIS

Cheynier, André. JOUANNET, grand-père de la préhistoire. 101 p. (Société historique et archéologique du Périgord). Brive, 1936. ISIS

Reviewed by PHILIP SHORR, *Isis* 29, 123-26, 1938.

Dehérain, Henri. Centenaire de SILVESTRE DE SACY. *Journal des savants* 31-3, 1938. ISIS

Nadler, Käte. G. W. F. HEGEL und C. G. CARUS. Zum Verhältnis idealistischer und romantischer Naturphilosophie. *Archiv für Geschichte der Medizin* 31, 164-88, 1938. ISIS

XIXth Century (second half)

A.—*Mathematics*

(Cantor, Georg; Dedekind, J. W. R.). Briefwechsel CANTOR-DEDEKIND. Edited by E. NOETHER and J. CAVAILLÈS. 61 p. (Actualités scientifiques et industrielles, 518). Paris, HERMANN, 1937. ISIS

Reviewed by L. C. YOUNG, *Mathematical gazette* 22, 211-12, 1938.

Losada y Puga, Cristóbal de. La personalidad y la obra de FEDERICO VILLARREAL, matemático peruano (1850-1923). 19 p. Lima, Imp. Americana, 1933. ISIS

Conferencia dada en la Universidad Católica del Perú, el domingo 13 de agosto de 1933. Publicada en la *Revista de la Universidad* 1, p. 646.

Meder, Albert E., jr. The American mathematical society, 1888-1938. *Science* 88, 230-32, 1938. ISIS

Ocagne, Maurice d'. TORRES-QUEVEDO et son œuvre mécanique. *Revue des questions scientifiques* 114, 5-14, 20 juillet, 1938. ISIS

B.—*Physical sciences and technology*

(Cannizzaro, Stanislao; Lieben, Adolf). Alcune lettere inedite di STANISLAO CANNIZZARO ad ADOLF LIEBEN. II. *Archeion* 21, 86-96, 1938. ISIS

Desch, C. H. HENRY LOUIS LE CHATELIER (1850-1936). *Obituary notices of the Royal society of London*, 2, 251-59, port., 1938. ISIS

Desch, Cecil H. The Le Chatelier memorial lecture. HENRY LE CHATELIER (1850-1936). A memorial lecture delivered on October 28, 1937. *Journal of the chemical society* 139-50, Jan. 1938. ISIS

Elbée, Jean D'. Un conquistador de génie : FERDINAND DE LESSEPS. Paris, Éditions littéraires de France. ISIS

Sandes, E. W. C. The royal engineers in Egypt and the Sudan. Introd. by SIR FRANCIS REGINALD WINGATE. XXVII + 571 p., maps, ills. Chatham, Institution of royal engineers, 1937. ISIS

Reviewed by HENRI DEHÉRAIN, *Journal des savants* 81-4, 1938.

Sunderman, F. William. ALEXANDER PORFIRIVICH BORODIN, physician, chemist and composer. *Annals of medical history* 10, 445-53, 3 fig., 1938. ISIS

Timmermans, Jean. JEAN SERVAIS STAS. *Journal of chemical education* 15, 353-57, ill., 1938. ISIS

Notice illustrée de vues de la Salle JEAN-STAS de l'Université de Bruxelles, récemment inaugurée, et de reproductions de manuscrits faisant partie des collections de ce petit musée. (Voir aussi *Isis* 28, 95, et 29, 235.)

C.—*Natural sciences*

Molengraaff, Gustav-Adolf-Frederik. Een blik op den snellen opbloei der Geologische Wetenschap in de laatste 50 jaren. Rede uitgesproken bij gelegenheid van zijn aftreden als Hoogleeraar op 1 April 1930. 20 p. Delft, WALTMAN, 1930. ISIS

History of geology during the last half century.

Ritter, William E. DARWIN and the golden rule. *Christian register* 1 p., Oct. 7, 1937. ISIS

Roland, Marcel. PASTEUR et les vers à soie. *Mercure de France* 287, 5-37, 1938. ISIS

D.—*Medical sciences*

Des Gachons, Jacques. Un novateur en pharmacie. STANISLAS LIMOUSIN, 1831-1887. *L'illustration* 364, port., 2 avril 1938. ISIS

Mettenheim, H. v. Erlebnisse eines alten Arztes. Aus dem Nachlass des Dr. med. CARL V. METTENHEIMER, Geh. Med. Rates und Grossherzogl. Mecklenburg-Schwerinschen Leibarztes (1824-98). *Archiv für Geschichte der Medizin* 31, 247-53, 1938. ISIS

Mettler, Cecilia C. DUGAS on the curability of inflammation. *Archives of surgery* 36, 845-48, 1938. ISIS

Mettler, Cecilia C. DUGAS on the removal of foreign bodies from the eye. *Archives of ophthalmology* 18, 998-99, 1937. ISIS

Mettler, Cecilia C. DUGAS on surgical principles. A manuscript of 1874. *Southern medical journal* 30, 1031-32, 1937. ISIS

White, William. *Aequanimitas :* OSLER's inspirational essays. *Bulletin of the institute of the history of medicine* 6, 820-33, 1938. ISIS

Wickersheimer, Ernest. PAUL DORVEAUX (1851-1938). *Janus* 42, 65-8, 1938. ISIS

E.—*Alia*

Devaux, Philippe. L'artistotélisme et le vitalisme de GOBINEAU. *Revue franco-belge* 593-605, 17 déc. 1937; 1-21, 18 janvier 1938. ISIS

Kohn-Bramstedt, Ernst. Aristocracy and the middle classes in Germany : social types in German literature, 1830-1900. XII + 362 p. London, KING, 1937 (15s). ISIS

This empirical study of the relations between literature and social history is a considerable contribution to the sociology of literature. It moves a distance toward answering the perennial question : to what extent does literature accurately depict society ? With abundant detail KOHN-BRAMSTEDT shows the ways in which literary types portray the ' social types ' of 19th century Germany and seeks to account for the failure of some current types to find expression in fiction at all. The juxtaposition of the actual social developments and their portrayal in novels illumines the general problem in a fashion which A. GUÉRARD's recent *Literature and society* only approximates. KOHN-BRAMSTEDT finds that *the* German novel from 1830-1900 was no homogeneous medium. The class status of the writer and of the public to which he appealed; the shifting roles of the aristocracy and middle classes during the period; the unsettled and ambiguous political developments of the time; the class conflicts and ambivalences; the changing evaluation of literature by the various social strata; these and related factors are seen to influence the fictional picturizations of the society in which they arise. In an elaborate analysis, which does not lend itself to a brief summary, the interplay of these elements is carefully traced, but is not reduced to a facile formula. This monograph commends itself to all who are concerned with the social role of literature. R. K. M.

Thorp, Margaret Farrand. CHARLES KINGSLEY, 1819-1875. X + 212 p., 5 pl. Princeton, University Press, 1937. ISIS

Reviewed by CHARLES A. KOFOID, *Isis* 29, 127-29, 1938.

Wistar, Isaac Jones. Autobiography of ISAAC JONES WISTAR, 1827-1905. VII + 528 p. Philadelphia, Wistar Institute of anatomy and biology, 1937. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 29, 126-27, 1938.

XXth Century

A.—*Mathematics*

Hobson, Ernest William (1856-1933). Obituary notice. *Obituary notices of fellows of the Royal society* 1, 237-49, port., 1934. ISIS

McLachlan, N. W. Historical note on HEAVISIDE's operational method. *Mathematical gazette* 22, 255-60, 1938. ISIS

Mercer, James (1883-1932). Obituary notice by E. W. HOBSON. *Obituary notices of fellows of the Royal society* 1, 164-65, port., 1933. ISIS

(Miller, George Abram). The collected works of GEORGE ABRAM MILLER. Volume II, XI + 537 p., port. Urbana, Ill., University of Illinois Press, 1938 ($ 7.50). ISIS

Volume 1 was reviewed in *Isis* vol. 26, 210-11. Volume 2 contains Professor MILLER's contributions to the theory of finite groups during the years from 1900 through 1907. All except the first and the last of these 108 memoirs were published during these years in American and European journals. The first memoir (no. 63) was written for this volume; it carries to 1908 the history of the theory of groups with special attention to those subjects to which Professor MILLER devoted his attention. This memoir, the three historical memoirs (nos. 1, 15, and 62) of volume 1, and three reports (nos. 64, 89, and 153) published in the *Bulletin of the American mathematical society* trace in considerable detail the development of the theory of groups up to 1908. During these years Professor MILLER began to write on subjects in the general history of mathematics, and his interest in general mathematical history has continued. The last paper printed in vol. 2 is entitled *Primary facts in the history of mathematics* (p. 493-528) and contains many original and valuable suggestions. I would advise historians of mathematics to read it carefully. G. S.

Muir, Sir Thomas (1844-1934). Obituary notice by H. W. TURNBULL. *Obituary notices of fellows of the Royal society* 1, 179-84, port., 1934. ISIS

Rogers, Leonard James (1862-1933). Obituary notice by A. L. DIXON. *Obituary notices of fellows of the Royal society* 1, 299-301, port., 1934. ISIS

B.—*Physical sciences and technology*

Chattock, Arthur Prince (1860-1934). Obituary notice by A. M. TYNDALL. *Obituary notices of fellows of the Royal society* 1, 293-98, port., 1934. ISIS

Davis, Tenney L. BORIS N. MENSHUTKIN's contributions to the history of chemistry. *Journal of chemical education* 15, 203-09, figs., 1938. ISIS

Biography of MENSHUTKIN, with portrait and complete list of his publications on the history of chemistry from 1895 to 1937. G. S.

Guében, Georges. LORD RUTHERFORD OF NELSON. *Revue des questions scientifiques* 113, 5-19, 20 janvier 1938. ISIS

Guillaume, Ch.-Ed., Notice nécrologique sur. *Rev. gén. des sc.* 309-10, 30 juin 1938. ISIS

Katsh, Abraham I. EINSTEIN's Theory of relativity. Portrait of EINSTEIN in frontispiece, 60 p. (in Hebrew). Tel-Aviv, Palestine, 1936. ISIS

Reviewed by DANIEL NORMAN, *Isis* 29, 132-33, 1938.

Pogo, Alexander. The writings of J. K. FOTHERINGHAM. *Isis* 29, 58-68, 1 fig., 1938. ISIS

Rosenhain, Walter (1875-1934). Obituary notice by C. H. DESCH. *Obituary notices of fellows of the Royal society* 1, 353-59, port., 1934. ISIS

Steele, Bertram Dillon (1870-1934). Obituary notice by Sir D. O. MASSON. *Obituary notices of fellows of the Royal society* 1, 345-48, port., 1934. ISIS

Unwin, William Cawthorne (1838-1933). Obituary notice by J. S. WILSON. *Obituary notices of fellows of the Royal society* 1, 167-78, port., 1934. ISIS

Veil, Suzanne. L'œuvre de LANGMUIR dans le domaine de l'adsorption. *Rev. scientifique* 271-76, 15 juillet 1938. ISIS

Veley, Victor Herbert (1856-1933). Obituary notice by J. A. GARDNER. *Obituary notices of fellows of the Royal society* 1, 229-35, port., 1934. ISIS

Urey, Harold C. Chemistry and the future. *Science* 88, 133-39, 1938. ISIS

Includes a list of main discoveries from 1899 to 1935.

C.—*Natural sciences*

Bather, Francis Arthur (1863-1934). Obituary notice by W. D. LANG. *Obituary notices of fellows of the Royal society* 1, 303-14, port., 1934. ISIS

Dawson, Percy M. Soviet samples. Diary of an American physiologist. XIV + 568 p. Ann Arbor, Mich., EDWARDS Bros., 1938 ($ 3.60). ISIS

The author of this diary is an American physiologist who spent eleven months in the Soviet Union and visited numberless laboratories, schools, etc. His main interests being physical education and physiology of sport, he found that a considerable amount of work was being done in the Soviet Union in those fields. He met a large number of scientists, and it is easy to find what he says of each, for his diary is beautifully indexed. In spite of some prolixity, the account is valuable, for its author, who does not conceal his Soviet sympathies, is a keen observer and an honest man. It is written in simplified spelling and lithoprinted from typescript. The two following extracts will illustrate the spelling and the author's view of the history of science :

" The loveliness of Leningrad ! It surpasses description ! Its colors ar exquisit, its proportions noble ! I kno of nothing so utterly bewitching. It is a loveliness that is felt so deeply that it pains." (p. 17.)

" We now fel into a littl more gossipy vein. ANDREYEV is interested in the History of Science & told of a visit to the S. U. of HENRY SIGERIST, the Prof. of the History of Medicine at Johns Hopkins, & of the formation of a small group in Moskow & Leningrad of persons interested in the History of Science. I warnd him of the danger which one not infrequently sees in America of indulging in hi-brow gossip which justifies itself when the subject is dead under the name of biograpy but wd. be regarded as trifling & ridiculous if the subject was alive. In the course of our conversation ANDREYEV made what seemed to me a remarkabl utterance, ' The outer Revolution is over & we hav now before us the inner Revolution which is a personal & individual matter, a change of attitude.' Again & again I hav pondered this saying. It illuminates a vast area in Soviet life, hope & aspiration." (p. 134)

Though the author is not interested in the history of science, his candid diary will remain a document of the first order for the history of Soviet science. G. S.

Ewart, James Cossar (1851-1933). Obituary notice by F. H. A. MARSHALL. *Obituary notices of fellows of the Royal society* 1, 189-95, port., 1934. ISIS

Hardy, William Bate (1864-1933). Obituary notice by Sir F. G. HOPKINS and Sir F. E. SMITH. *Obituary notices of fellows of the Royal society* 1, 327-33, port., 1934. ISIS

Hedley, Sir Walter Coote (1865-1937). Obituary notice by M. N. MACLEOD. *Geographical journal* 91, 399-400, 1938. ISIS

Head of the geographical section of the General staff, 1911-1920. C. W. A.

Hilton-Simpson, Melville William (1881-1938). Obituary notice. *Geographical journal* 91, 575-76, 1938. ISIS

Ethnographer in Atlas mountains. C. W. A.

Joly, John (1857-1933). Obituary notice. *Obituary notices of fellows of the Royal society* 1, 259-86, port., 1934. ISIS

Kitchin, Finlay Lorimer (1870-1934). Obituary notice by H. WOODS. *Obituary notices of fellows of the Royal society* 1, 349-52, port., 1934. ISIS

Marr, John Edward (1857-1933). Obituary notice. *Obituary notices of fellows of the Royal society* 1, 251-57, port., 1934. ISIS

Scott, Dukinfield Henry (1854-1934). Obituary notice by A. C. SEWARD. *Obituary notices of fellows of the Royal society* 1, 205-27, port., 1934. ISIS

Vines, Sydney Howard (1849-1934). Obituary notice by A. B. RENDLE. *Obituary notices of fellows of the Royal society* 1, 185-8, port., 1934. ISIS

D.—*Medical sciences*

Calmette, Léon Charles Albert (1863-1933). Obituary notice by C. J. MARTIN. *Obituary notices of fellows of the Royal society* 1, 315-25, port., 1934. ISIS

Chauvois, L. La commémoration du cinquantenaire de l'élection du Dr. D'ARSONVAL à l'Académie de médecine. *Rev. gén. des sc.* 310-11, 30 juin 1938. ISIS

Cohn, Alfred E. JOHN WYCKOFF : 1881-1937. *Bulletin of the Institute of the history of medicine* 6, 835-57, port., 1938. ISIS

Frik, Feridun. Türkiye Cumhuriyetinde Tib ve Hifzissihha Hareketleri, 1923-1938 (Works in medicine and public health in the Republic of Turkey, 1923-1938). 32 p. Leverkusen, BAYER, 1938 (in Turkish). ISIS

Houston, Sir Alexander Cruikshank (1865-1933). Obituary notice by M. H. GORDON. *Obituary notices of fellows of the Royal society* 1, 335-44, port., 1934. ISIS

Huber, G. Carl. Memorial volume. *Journal of comparative neurology* 65, L+711 p., 173 fig., port., 1936. ISIS

Reviewed by CHARLES A. KOFOID, *Isis* 29, 133, 1938.

Kagan, Solomon R. The life and letters of FIELDING H. GARRISON. With a foreword by JAMES J. WALSH. Boston, Medico-historical press, 1938. ISIS

Reviewed in *Annals of medical history* 10, 462, 1938.

Macallum, Archibald Byron (1858-1934). Obituary notice by J. B. LEATHES. *Obituary notices of fellows of the Royal society* 1, 287-91, port., 1934. ISIS

Malloch, Archibald. Short years. The life and letters of JOHN BRUCE MACCULLUM, M.D. XX + 343 p. Chicago, Normandie House, 1937. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 29, 134, 1938.

Roux, Pierre Paul Émile (1853-1933). Obituary notice. *Obituary notices of fellows of the Royal society* 1, 197-204, port., 1934. ISIS

Vittoz, Roger (-1925). An unfinished manuscript. Notes for a book on the Vittoz method by JOSEPHINE VAN SLYCK THORN. 140 p. Privately printed, Lancaster Press, Lancaster, Pa., 1937. ISIS

Mrs. THORN died in 1935 leaving her notes incomplete. The name of the editor is not given. ROGER VITTOZ of Lausanne had explained his method in a book entitled *Neurasthenia* (1907), translated into English. Mrs. THORN was a pupil of Dr. VITTOZ from 1911 to 1925, and a psychologist practising in New York City and Lausanne from 1915 to her death. The purpose of the Vittoz method is to fight neurasthenia, and to help in reconstructing the personality and readapting it to its surroundings. G. S.

White, William Alanson. The autobiography of a purpose. With an introduction by RAY LYMAN WILBUR. XIX + 293 p. New York, DOUBLEDAY, DORAN, 1938 ($ 3.00). ISIS

WILLIAM ALANSON WHITE (1870-1937) was at the time of his lamented death on 7 March 1937 the leading psychiatrist in the United States. For more than thirty years he had been the superintendent of Saint Elizabeth's, the government hospital for the mentally ill in Washington, as well as professor of psychiatry at Georgetown and George Washington medical schools. It is due chiefly to WHITE's activities that psychiatry has come to form an integral part of the medical curriculum in the United States to-day. A large number of American psychiatrists in practice to-day were trained and influenced by WHITE, and through the pages of the *Psychoanalytic review* which he edited and published from 1913 to the time of his death, as also through the well-known *Nervous and mental disease monograph* series which he edited together with Dr. SMITH ELY JELIFFE, WHITE exerted a tremendous influence upon the development of psychiatric thought in this country. He has left a considerable school behind him which operates from its center in Washington. The 14th edition of WHITE's great text-book *Outlines of psychiatry* appeared in 1935; it was first published in 1907. In the present posthumously published work WHITE tells the story of his work rather than of his life. The great human sympathy of the man is felt in every word that he writes, and although his writing is rather undistinguished, it never fails in interest. We could have wished the book a great deal longer than it is. It may be noted here that WHITE was the first medical man to use the malaria treatment for paresis in America (1922). There is a bibliography of WHITE's writings running to some 286 items.

M. F. A.-M.

E.—*Alia*

Garland, Hamlin. Forty years of psychic research. A plain narrative of fact. X + 394 p., port., frontispiece. New York, MACMILLAN, 1937 ($ 3.50). ISIS

This is stated in the preface to be the psychic logbook of the author's experiences with supernormal or in recent terminology parapsychological phenomena. They are written from memory and the names of the psychics are fictitious. The author was associated for a time with the physicist A. E. DOLBEAR and B. O. FLOWER, editor of the *Arena* in an American Psychic Society which interviewed mediums. This book is a series of recollections of these seances and of others later participated in by the author, a novelist of the Middle West. There seems little to justify the use of the terms research and science to characterize the procedures or the conclusions. Hypnotism and trickery seem not to have been excluded whatever else the phenomena reported may have portended. C. A. K.

PART II

HISTORICAL AND ETHNOGRAPHICAL CLASSIFICATION

I. — ANTIQUITY

1. — ANTIQUITY (*generalities*)

Calderini, Aristide. Manuale di papirologia antica greca e romana. 196 p., 4 pl. Milan, CESCHINA, 1938. ISIS

Reviewed by MARCEL HOMBERT, *Chronique d'Égypte* 13, 414, 1938.

Forbes, R. J. Petroleum and bitumen in antiquity. *Ambix* 2, 68-92, 1938. ISIS

Sticker, Georg. Vorgeschichtliche Versuche der Seuchenabwehr und Seuchenausrottung. *Essays presented to* KARL SUDHOFF, p. 3-62, Zurich, 1924. ISIS

2. — EGYPT

Buck, Adriaan de. The Egyptian coffin texts, II. Texts of spells 76-163. XIV + 405 p. (University of Chicago Oriental Institute publications, 49). Chicago, University Press, 1938. ISIS

Reviewed by JEAN CAPART, *Chronique d'Égypte* 13, 312, 1938.

Collart, Paul. Les papyrus scolaires. *Mélanges* DESROUSSEAUX, p. 69-80, Paris, 1937. ISIS

Reviewed by MARCEL HOMBERT, *Chronique d'Égypte* 13, 433, 1938.

Hohlwein, Nicolas. Le blé d'Égypte. *Études de papyrologie* 4, 33-120, 1938. ISIS

Reviewed by CLAIRE PRÉAUX, *Chronique d'Égypte* 13, 429-32, 1938.

Hume, W. F. Geology of Egypt. Vol. II, part 3. The minerals of economic value, associated with the intrusive pre-cambrian igneous rocks and ancient sediments, and methods suggested for the dating of historical and geological times. XXXV + 386 p. Cairo, Government press, 1937. ISIS

Reviewed by C. N. B., *Geographical journal* 92, 75-7, 1938. Three chapters deal with gold, all other metals of which ores have been found in

pre-cambrian rocks of Egypt, and with the precious and semi-precious minerals and ornamental or economically useful rocks associated with that formation. All the known ancient workings are described and in many cases illustrated. A fourth chapter deals with the methods of dating the dynastic periods, the divisions of the stone age, and the dating of geological periods. C. W. A.

Keimer, Ludwig. Remarques sur le porc et le sanglier dans l'Égypte arcienne. *Bulletin de l'Institut d'Égypte* 19, 147-56, 3 pl., fig., 1936-37. ISIS

Reviewed by JEAN CAPART, *Chronique d'Égypte* 13, 315, 1938.

Pfister, R. Les textiles du tombeau de TOUTANKHAMON. *Revue des arts asiatiques* 11, 207-18, 4 pl., 4 fig., 1937. ISIS

Posener, G. Le canal du Nil à la Mer Rouge avant les PTOLÉMÉES. *Chronique d'Égypte* 13, 259-73, 1938. ISIS

Van der Waerden, B. L. Die Entstehungsgeschichte der ägyptischen Bruchrechnung. *Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik*, Abtg. B : Studien 4, 359-82, 1938. ISIS

3. — BABYLONIA AND ASSYRIA

Drower, E. S. (" **E. S. Stevens** "). The Mandaeans of 'Irâq and Îrân. Their cults, customs, magic legends, and folklore. XXV + 436 p., 29 pl., 16 fig. Oxford, Clarendon Press, 1937. ISIS

Reviewed by MAURICE A. CANNEY, *Journal of the royal Asiatic society* 629-30, 1938.

Forbes, R. J. Neues zur ältesten Geschichte des Bitumens. *Bitumen* H. 6 u. 7, 32 p., fig., 1938. ISIS

Gandz, Solomon. L'origine e lo sviluppo delle equazioni di secondo grado nell' algebra babilonese, greca e araba. *Atti del 1° Congresso dell' unione matematica Italiana* 528-31. ISIS

Martiny, Günter. Die geographische und astronomische Orientation altmesopotamischer Tempel. *OLZ* 41, 665-72, 1938. ISIS

Neugebauer, O. Untersuchungen zur antiken Astronomie V. Der Halleysche " Saros " und andere Ergänzungen zu UAA III. *Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik*, Abtg. B : Studien, 4, 407-11, 1938. ISIS

Oppenheim, Leo. Šeqel, Mine und Talent in Nuzi. *Orientalistische Literaturzeitung* 41, 485-86, 1938. ISIS

Peake, H. J. E.; Desch, C. H.; and others. Eighth report of the committee appointed to report on the probable sources of the supply of copper used by the Sumerians. 2 p. British Association, section H, Cambridge, 1938. ISIS

Perrot, Nell. Les représentations de l'arbre sacré sur les monuments de Mésopotamie et d'Élam. 143 p., 32 pl. Paris, GEUTHNER, 1937 (60 fr.). ISIS

The readers who have followed the discussion concerning date culture in Babylonia by G. SARTON (*Isis*, 21, 8-13, 4 pl., 1934; 23, 251-2, 1935; 26, 95-8, 1936) and by S. GANDZ (23, 245-50, 1935) will turn eagerly to this volume but will be disappointed as I was. PERROT has made a very elaborate study of the motif and its very long evolution and has illustrated it with 140 schematic drawings but concludes nothing as to the meaning of that motif. G. S.

Rutten, Maggie. Trente-deux modèles de foies en argile inscrits provenant de Tell-Hariri (Mari). *Revue d'Assyriologie* 35, 36-70, 18 pl., 1938. ISIS

" Les archives découvertes à Mari (Tell-Hariri) par M. A. PARROT comprennent des lettres, des textes de comptabilité et des textes divinatoires. Au cours de la campagne de fouilles de 1935-36, parmi les tablettes provenant du palais, dans la salle 108, se trouvaient trente-deux foies en argile couverts d'inscriptions. MM. THUREAU-DANGIN et PARROT ont bien voulu me charger de leur publication." ... " Les archives de Mari ont pour date terminale celle qui correspond à la destruction de cette ville par HAMMURAPI." ... " Ces foies sont donc antérieurs à ceux connus jusqu'ici, dont le plus ancien ne peut remonter plus haut que le règne de HAMMURAPI. Avant la découverte de Mari on ne connaissait qu'un tout petit nombre de ces modèles : deux appartenant au British Museum, cinq provenant de Boghaz-Keui, d'autres découverts sur le même site pendant les récentes campagnes de fouilles, ainsi qu'un modèle de foie trouvé à Megiddo." ... " Nos documents se signalent par quelques caractéristiques : 1. La principale caractéristique des foies de Tell-Hariri, c'est d'avoir renversé la formule divinatoire habituelle en ce sens que le foie est dépendant de l'événement qui se produira. On ne dit pas : ' Si telle partie du foie présente telle anomalie, il se produira tel événement,' mais au contraire : ' Lorsque tel événement s'est produit, ou se produira, le foie se présenta ou se présentera ainsi.' 2. Dans l'écriture, la caractéristique la plus fréquente de nos textes divinatoires est l'emploi de la valeur la plus rare de certains signes." ... " 3. Contrairement aux textes de plus basse époque, les foies de Mari emploient les valeurs syllabiques et ne recourent pas aux idéogrammes."

Stein, Aurel. Note on remains of Rome's Mesopotamian limes surveyed in Irâq territory. *Journal of the royal Asiatic society* 423-26, 1938. ISIS

Thureau-Dangin. F. La méthode de fausse position et l'origine de l'algèbre. *Revue d'Assyriologie* 35, 71-7, 1938. ISIS

" Tel est, à mon sens, le fondement logique des opérations faites par le scribe pour obtenir la solution. Tout fait croire que l'algèbre procède de la méthode de fausse position. Les deux méthodes ont été longtemps si intimement liées qu'il est difficile de fixer l'instant précis où l'une finit et où l'autre commence."

4. — GREECE

Chabanier, Eugène. Contribution des astronomes grecs à la géographie antique. *Comptes rendus du congrès international de géographie*, Amsterdam 1938, 2 (section 4), 118-21, 1 map. ISIS

Robinson, Victor. The nurse of Greece. *Bulletin of the Institute of the history of medicine* 6, 1001-09, 1938. ISIS

Thompson, D'Arcy Wentworth. A glossary of Greek birds. A new edition. VII + 342 p., figs. (St. Andrews University publications, 39). Oxford University Press, 1936. ISIS

Reviewed by GEORGE SARTON, *Isis* 29, 135-8, 1938.

Wiggers, K. *Περὶ φρενός* of : De zetel van het Verstand volgens de Grieken. *Bijdragen tot de geschiedenis der geneeskunde* 18, 142-44, 1938. ISIS

5. — ROME

Straker, Ernest; Margary, Ivan D. Ironworks and communications in the Weald in Roman times. *Geographical journal* 92, 55-60, 1938. ISIS

II. — MIDDLE AGES

6. — MIDDLE AGES (*generalities*)

Ameisenowa, Zofia. Mediaeval alchemical illustrations in a manuscript of Jagellonian Library. p. 216-18. (Ex : Kalendarz J. K. C. na rok 1939). Kraków 1938 (in Polish). ISIS

Castiglioni, Arturo. Il Salasso nell' arme gentilizia dei MANFREDI, signori di Faenza. *Essays presented to* KARL SUDHOFF, p. 159-82, 19 fig., Zurich, 1924. ISIS

Apropos of the lancet appearing on the shield of the MANFREDI lords of Faenza. G. S.

Castiglioni, Arturo. The school of Salerno. *Bulletin of the Institute of the history of medicine* 6, 883-98, 1938. ISIS

Diepgen, Paul. Die Bedeutung des Mittelalters für den Fortschritt in der Medizin. *Essays presented to* KARL SUDHOFF, p. 99-120, Zurich, 1924. ISIS

Garosi, A. Perizie e periti medico legali in alcuni capitoli di legislazione statutaria medioevale. *Rivista di storia delle scienze mediche* 29, 157-67, 1938. ISIS

Haberly, Loyd. Mediaeval English pavingtiles. 327 p. Oxford, BLACKWELL, 1937. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 29, 141, 1938.

MacKinney, Loren C. Early medieval medicine with special reference to France and Chartres. 245 p., port. (Institute of the history of medicine, Johns Hopkins Univ. ser. 3, vol. 3). Baltimore, Johns Hopkins Press, 1937. ISIS

Reviewed by MARY CATHERINE WELBORN, *Isis* 29, 138-40, 1938.

Olschki, Leonardo. Storia letteraria delle scoperte geografiche. 6 + 232 p. Firenze, OLSCHKI, 1937. ISIS

Reviewed by G. R. CRONE, *Geographical journal* 91, 391, 1938. "The resemblances in style and recurrence of themes in medieval accounts of travel are due to a conventional body of tradition and romance, by reference to which the writers sought to convey a more vivid conception of peoples and places. In order to understand their accounts, it is necessary to allow for this convention, which frequently masked their actual observations."

(Thompson, James Westfall). Medieval and historiographical studies in honor of JAMES WESTFALL THOMPSON. Edited by JAMES LEA CATE and EUGENE N. ANDERSON. x + 199 p., Univ. of Chicago Press, 1938. ISIS

Reviewed by LYNN THORNDIKE, *Isis* 29, 142, 1938.

Thorndike, Lynn. Astronomy according to the Jews. *Isis* 29, 69-71, 1938. ISIS

Apropos of the astrological treatise entitled *Astronomica secundum Iudeos*. G. S.

Thorndike, Lynn; Kibre, Pearl. A catalogue of incipits of mediaeval scientific writings in Latin. XVI + 926 p. Cambridge, Medieval academy of America, 1937. ISIS

Reviewed by MARY CATHERINE WELBORN, *Isis* 29, 140-41, 1938.

III. — ORIENTAL SCIENCE AND CIVILIZATION

8. — WESTERN ASIA (*including "The ancient East" in general*)

Harris, Zellig S. Ras Shamra : Canaanite civilization and language. *Annual report of the Smithsonian Institution for the year ending June 30, 1937*, p. 479-502, 4 pl., 2 fig., 1938. ISIS

Ünver, A. Süheyl. L'application du hénné comme traitement de la peste dans l'histoire de la médecine turque. *Türk tib tarihi arkivi* 2, no. 7, 3-4, 1938. ISIS

CENTRAL ASIA

Gettens, Rutherford J. The materials in the wall paintings from Kizil in Chinese Turkestan. *Technical studies* 6, 282-94, 6 fig., 1938. ISIS

EASTERN ASIA

(*Including works relative to the whole of Buddhist Asia, or to India, Central and Eastern Asia combined.*)

David-Neel, Alexandra. Vom Leiden zur Erlösung. Sinn und Lehre des Buddhismus. Aus dem Französischen von ADA DITZEN. 196 p. Leipzig, BROCKHAUS, 1937. ISIS

Reviewed by F. WELLER, *OLZ* 41, 453, 1938.

Schoute, D. De geneeskunde in den dienst der Oost-indische compagnie in Nederlandsch-Indië. 347 p. Amsterdam, DE BUSSY, 1929. ISIS

Study of medicine in the service of the Dutch East-Indian Company in the Dutch East Indies. The importance of this book for the history of tropical medicine should have been explained to our readers a long time

ago, but we received no review copy and though we knew of the book, we never saw it until now. The period covered is the seventeenth and eighteenth centuries. A chronological summary would have been helpful. Though the account is primarily medical, it is strange to find but one evanescent mention of RUMPHIUS (p. 73), for whom see *Isis* (27, 242-57, 1937). G. S.

9. — INDIA

Chakraberty, Chandra. Sexology of the Hindus. 126 p. Calcutta, KRISHNA (no date, received Sept. 1938). ISIS

Coomaraswamy, Ananda K. The inverted tree. *Quarterly journal of the mythic society* 29, 39 p., Bangalore (received Nov. 1938). ISIS

Datta, Bibhutibhusan. Application of indeterminate analysis to astronomical problems. *Archeion* 21, 28-34, 1938. ISIS

Devi, Srimati Akshaya Kumari. The evolution of the Rigvedic pantheon. 212 p. Calcutta, KRISHNA, 1938. ISIS

Ghosh, Manomohan. ŚÛLAPÂṆI's *caturaṅga-dîpikâ*. A manual of fourhanded dice-chess. Critically edited for the first time with translation, notes and introduction. Calcutta, Metropolitan Printing House, 1936. ISIS

Heine-Geldern, Robert. Archaeological traces of the Vedic Aryans. *Journal of the Indian society of oriental art* 29 p., 3 pl., Dec. 1936. ISIS

" While plenty of efforts have been made to ascertain the origin of the Vedic Aryans and the date of their immigration into India by philological, linguistical and even astronomical methods, archaeology has until now taken no part in this research. Indeed, not the slightest archaeological trace, no finds whatever made in Indian soil could with any probability be ascribed to the Aryans of the early Vedic period. As late as 1921 Sir JOHN MARSHALL, in the first volume of the *Cambridge history of India*, still mentions the tumuli of Lauryâ Nandangarh in Bihar as the only monuments possibly dating from Vedic, i.e., in this case, from late Vedic times (8th, or 7th century B. C.). Since the excavations at Mohenjo-daro and Harappâ, however, a series of North-Indian finds begin to distinguish themselves from the pre-Aryan culture discovered at these sites, finds we are now bound to discern as from a later date than the Indus civilization and possibly belonging to the Vedic age. They will form the subject of the following investigations."

Kern Institute, Leyden. Annual bibliography of Indian archaeology, volume XI, for the year 1936. VI + 125 p., 13 pl., 2 fig. Leyden, BRILL, 1938. ISIS

Kohl, Josef Friedrich. Die *Sûryaprajñapti.* Versuch einer Textgeschichte. XLIV + 112 p. (Bonner Orientalist. Stud., 20). Stuttgart, KOHLHAMMER, 1937. ISIS

Reviewed by WALTHER SCHUBRING, *OLZ* 41, 562-64, 1938. " Die *Sûrapannatti* (*Sûryaprajñapti*, S.) des Jaina-Kanons ist im Ganzen genommen eine Physik der Gestirne, die sich aus deutlich unterscheidbaren Teilen zusammensetzt und somit Entstehungsfragen wachruft."

Mackay, Ernest. Excavations at Chanhu-daro by the American school of Indic and Iranian studies and the Museum of Fine Arts, Boston : season 1935-36. *Annual report of the Smithsonian Institution for the year ending June* 30, 1937, p. 469-78, 10 pl., 1 fig., 1938. ISIS

Reprinted by permission from the *Bulletin of the Museum of Fine Arts* 34, 1936.

Pfister, R. Les toiles imprimées de Fostat et l'Hindoustan. 106 p., 36 pl., 73 fig. Paris, Les éditions d'art et d'histoire, 1938. ISIS

Nous avons déjà signalé plusieurs études importantes du même auteur relatives aux textiles de l'Orient classique (voir par ex., *Isis* 28, 160). Le présent ouvrage, admirablement illustré, ne le cède en rien aux précédents. L'auteur est capable de préciser nos connaissances sur plusieurs points parce qu'il est non seulement archéologue mais aussi chimiste. Il démontre que l'Orient méditerranéen n'a pas su teindre les fibres végétales (coton et lin); le procédé décrit par PLINE (*NH* 35, 42) ne s'applique qu'à la laine. L'Inde, dès le I^{er} siècle et probablement bien avant a été le fournisseur universel de coton et de cotonnades teintes. L'auteur conclut : " Il ne s'agit pas ici de rechercher si l'impression sur tissus a été inventée en Chine, aux Indes, ou dans le monde méditerranéen; le problème qui nous intéresse en ce moment est particulier au coton; l'impression sur coton se rattache étroitement à la teinture du coton et, d'après tout ce que nous avons essayé de faire ressortir, cette grande invention a été faite aux Indes et pas ailleurs. Les tissus les plus anciens que Fostat nous a conservés dans ses tas de détritus doivent dater du XII^{e} siècle; nous n'avons aucun témoignage net indiquant qu'à cette époque et jusqu'au XVI^{e} siècle on ait produit des cotonnades imprimées ailleurs qu'aux Indes. Il semble bien que presque toutes ces impressions, au moins jusqu'au XVI^{e} siècle ont été obtenues en imprimant (ou en posant à la main) une réserve et en passant ensuite dans un bain de teinture. On obtenait ainsi des dessins blancs sur fond de couleur; presque tous les fragments que nous avons décrits se présentent ainsi. Cependant il est certain qu'on a aux Indes, à la même époque, fabriqué aussi des toiles à fond blanc décorées d'un semis de couleur. C'est

la signification primitive du mot *chintzes* et encore au XV^e^ siècle nous trouvons sur les miniatures jainas et autres surtout des costumes à fond clair. Il y avait donc, pour ce genre, une forte consommation dans l'Inde même. Nous avons vu que presque toutes les toiles trouvées à Fostat sont grossières, elles étaient destinées à la consommation populaire. TAVERNIER, en parlant de la Perse, dit que le petit peuple n'achète que des étoffes de couleur parce que les taches n'y paraissent pas; il est très possible que des considérations de ce genre aient fait préférer au Caire aussi les tissus à fond foncé." G. S.

10. — CHINA

Chatley, Herbert. The date of the Hsia calendar *Hsia Hsiao Chêng*. *Journal of the royal Asiatic society* 523-33, Oct. 1938. ISIS

" The document is practically a farmer's calendar, but it includes comments on weather, the stars, animal and vegetable life, all arranged under the twelve moons of the year. The style is very terse, but includes explanatory remarks which seem to indicate that it has absorbed a brief commentary into the text. It is the object of the following notes to discuss the astronomical content of this calendar and hence the date of its composition. The latter can be deduced to a certain extent by the shift of the star positions at a given time of day on a given day of the year, due to the precession of the equinoxes resulting from the earth's third rotation (about the axis of the ecliptic once in 26,000 years)." ... " On account of this roughness of the data, the date *might* be pushed back to say 700 B. C., or conversely could be drawn down almost to the early Han period (206 B. C.), although the latter is not probable." ... " In any case this calendar cannot be of the Hsia period (traditional date, now known to be erroneous, 2205-1766 B. C.; possible date 2000-1500 B. C.), since this is far beyond the limits of error in the precessional calculations given above."

Eberhard, Wolfram. Early Chinese cultures and their development : a new working-hypothesis. *Annual report of the Smithsonian Institution for the year ending June* 30, 1937, p. 513-30, 1 fig., 1938. ISIS

Goodrich, L. Carrington. China's first knowledge of the Americas. *Geographical review* 28, 400-11, 3 fig., 1938. ISIS

Detailed account of Chinese geographical knowledge with special reference to the new world. Facsimiles of the American parts of the Chinese maps of RICCI (1602) and VERBIEST (1674). " Just when the Chinese of the cultured classes began to learn of the Americas we do not know precisely. It was probably not until the end of the sixteenth century. Syphilis and maize, both of American origin, seem to have won the race against any map or account of these regions in Chinese, syphilis being noticed in 1505 and recorded in 1545 and maize accurately described in a book published in 1573. It was not until the autumn of 1584 that the first map of the then

known world, with appropriate Chinese names and descriptions, was prepared by MATTEO RICCI, the great Jesuit missionary, with the assistance of a Chinese interpreter, and presented in manuscript to the assistant judicial commissioner of Kuangtung, who promptly printed it. If any description of the New World appeared before 1584, we have no record of it."

Hartner, Willy. Some notes on Chinese musical art. *Isis* 29, 72-94, 1938. ISIS

Levis, John Hazedel. Foundations of Chinese musical art. XIII + 233 p., ill. Peiping, VETCH, 1936. ISIS

Discussed by W. HARTNER, *Isis* 29, 72-94, 1938.

(Metropolitan Museum). Chinese bronzes of the Shang (1766-1122 B.C.) through the T'ang dynasty (A.D. 618-906). An exhibition lent by American collectors and museums and shown in gallery D 6, from October 19 through November 27, New York, 1938. XXXII + 30 p., ills. ($ 1). ISIS

Well illustrated catalogue of an astounding exhibition of Chinese bronzes (some 500) with an introduction by ALAN PRIEST, an analysis or characteristics based on B. KARLGREN's memoir (Stockholm 1936) and a classification of shapes with the Chinese names but unfortunately without the Chinese characters. One of the strangest things about those monuments is that the earliest ones (of the Shang dynasty) are the most finely conceived and executed. Some 87 examples of Shang bronzes were brought together! —The Buddhist bronzes (Wei, Sui, T'ang, i.e., fifth to ninth century) represent a very different art. Among the fifty examples shown some are exceedingly lovely. Perhaps it would have been better to separate them more completely from the ancient bronzes; on the other hand the juxtaposition of the ancient and Buddhist bronzes helped us to realize the great complexity of Chinese culture. A magnificent exhibition of which this modest but elegant catalogue will perpetuate the memory. G. S.

Nôda, Chûryô. Gyô-ten ni mieta tenmon (On the " Four culminated stars " in the *Yao-tien*). *Tôhô Gakuhô* (Journal of oriental studies), 118-43, Kyoto, Oct. 1937. ISIS

The astronomical observations that appear in the *Yao-tien* probably are the oldest extant record in China on the subject. Judging from the phenomena of the " Four culminated stars," the date of observations must be about 2,000 years before Christ. This, however, does not mean that the *Yao-tien* was compiled in such remote antiquity. Today we only know that it is older than the *Li-chi* which dates back to 620 B. C.

The author reviews the research of Japanese and Western scholars on the " Four culminated stars." S. S.

Prip-Møller. J. Chinese Buddhist monasteries. Their plan and its function for Buddhist monastic life. Folio, many illustr. Copenhagen, GAD, 1937 (Oxford U. Press, London). ISIS

Elaborate investigations magnificently illustrated. Splendid standard book. G. S.

Seligman, C. G.; Beck, H. C. Far eastern glass : some western origins. *Bulletin of the Museum of far eastern antiquities* no. 10, 64 p., 17 pl., Stockholm, 1938. ISIS

Elaborate memoir, admirably illustrated. Tentative conclusions : " We know that the great trans-Asiatic highway linking Europe and China was not organized throughout its length until the second century B. C., but long before this Europe had indirectly been in contact with the Far East by a hand to hand trade across the steppe, probably in part along the future trade route. Early in our era, glass vessels of western make were reaching the Far East, but centuries before this—c. 300 B. C. or earlier—two entirely differently ornamented types of western beads were reaching China in sufficient numbers to be admired and to be copied on a considerable scale, though such copying was not servile and the foreign elements might be considerably modified. Both types of bead were common in Europe at the beginning of the Late Iron Age, say 500-400 B. C., but apart from differences in style, not always very definite, the Chinese examples can be distinguished from their western prototypes by the presence in the former of a considerable amount of barium, an element that in beads of western origin is only found occasionally as a trace." ... " We believe that with the transit of La Tène beads from Europe across Siberia to the Far East there passed also the knowledge and the products of an enormously more important invention, and that we may regard the western beads we have described as entering China on the wave of culture that gave China iron."

12. — ISRAEL

(Including works devoted to Palestine)

Baron, Salo W. A social religious history of the Jews. 3 volumes. Vol. 1, XIV + 377 p.; vol. 2, X + 462 p.; vol. 3, XII + 406 p. New York, Columbia Univ. Press, 1937. ISIS

Reviewed by SOLOMON GANDZ, *Isis* 29, 148-50, 1938.

Bernstein, Abraham. The art of obstetrics as developed from the *Talmud*. *Medical life* 45, 195-204, 1938. ISIS

Friedenwald, Harry. Jewish physicians of Spain and Portugal. Historical notes and anecdotes. *Medical life* 45, 205-220, 1938. ISIS

Glatzer, Nahum Norbert. Geschichte der talmudischen Zeit. 178 p. Berlin, Schocken Verlag, 1937. ISIS

" Mit gutem Recht steht in der hier zu behandelnden Epoche zwischen der Zerstörung des zweiten Tempels im Jahre 70 und dem Abschluss des babylonischen Talmuds um das Jahr 500, der Talmud selbst, das *Werk* dieser Zeit, im Vordergrund aller Betrachtung. Doch sollen hier weder der Talmud, seine Entstehung und sein Aufbau, noch das in ihm entwickelte Recht, der in ihm nach Ausdruck ringende Glaube, die in ihm zu Worte kommenden Gelehrten behandelt werden. Es soll vielmehr der Versuch gemacht werden, auf die Epoche als auf eine in ihrer Art besondere innerhalb unsrer Geschichte hinzuweisen : auf den grossen Prozess der Ausbildung eines Volkes, dessen Kernteil die Erfüllung des in der Lehre ausgesprochenen göttlichen Willens als sein letztes Ziel ansah, ohne doch die Lebensform als Volk und die Verbindung mit Erez Israel als dem heimatlichen Boden preiszugeben. Was das in der Welt der ausgehenden Antike bedeutet, soll die Darstellung zeigen."

Judaism and Christianity. Vol. I. The age of transition. Edited by W. O. E. OESTERLEY. XII + 304 p. Vol. II, The contact of Pharisaism with other cultures. Edited by H. LOEWE, XXII + 371 p. New York MACMILLAN, 1937. ISIS

Reviewed by SOLOMON GANDZ, *Isis* 29, 150-53, 1938.

Kisch, Guido. Die Prager Universität und die Juden, 1348-1848. Mit Beiträgen zur Geschichte des Medizinstudiums. X + 239 p. Mährisch-Ostrau, 1935. For sale by the author, 110, Morningside Drive, New York City ($ 6.00). ISIS

" Die geistigen Beziehungen der Juden zu den Hochschulen sind bisher wenig erforscht. Ihnen in ihrer geschichtlichen Entwicklung für eine einzelne Universität systematisch nachzugehen, ist meines Wissens überhaupt noch nicht unternommen worden. Die vorliegende Arbeit wagt auf Grund des von mir seit mehr als zehn Jahren gesammelten Quellenmaterials einen ersten Versuch in dieser Richtung und will vor allem die Probleme aufzeigen, um die es sich bei solchen Forschungen handelt. Dass die Entwicklung der ältesten Universität in Mitteleuropa für sie den historischen Rahmen darbieten musste, ergab sich zwangsläufig. Fast ebenso selbstverständlich erscheint die bedeutsame historische Rolle, die der Universität Halle beim Aufstieg der Juden zu wissenschaftlicher Bildung zufiel; im Geiste der Toleranz und Aufklärung 1694 gegründet, beschritt sie nämlich in ihrer Einstellung zu den Juden bald neue freiheitliche Bahnen. Die inneren Beziehungen des Verfassers zu der Problemstellung und seine persönliche Verbundenheit mit den Universitäten in Prag und Halle, an denen er als ordentlicher Professor der Rechtsgeschichte gewirkt hat, sind für die Verwirklichung des lange gehegten Planes dieser Darstellung von bestimmendem Einfluss gewesen."

Inhalt : 1. Der katholische Charakter der Prager Universität; 2. Wissen-

schaftspflege in der Prager Judenstadt; 3. Berührungen der Prager Juden mit der Universität; 4. Jüdische Ärzte in Prag; 5. Die Ausbildung der Prager jüdischen Ärzte bis zum Beginn des 18. Jahrhunderts; 6. Prager Juden auf deutschen Universitäten; 7. Die Aufsicht der Prager medizinischen Fakultät über das Medizinalwesen der Judenstadt in Prag; 8. Zulassung der Juden zur Prager Universität; 9. Die ersten jüdischen Doktoren der Prager Universität; 10. Die ersten jüdischen Professoren an der Prager Universität.

Matthews, Charles D. The significance of nomadism for Hebrew origins. *Moslem world* 8 p., October 1938. ISIS

Obermann, Julian. The archaic inscriptions from Lachisch. A non-Phoenician system of the north Semitic alphabet. *Journal of the American oriental society* supplement no. 2, 48 p., 3 pl., 1938. ISIS

Waxman, Meyer. A history of Jewish literature. 3 vols., Vol. 1, XVI + 501 p.; vol. 2, X + 698 p., vol. 3, XII + 797 p. New York, BLOCH, 1930-36. ISIS

Reviewed by SOLOMON GANDZ, *Isis* 29, 145-48, 1938.

13. — IRAN

Farmer, Henry George. The instruments of music on the Ṭâq-i Bustân bas-reliefs. *Journal of the royal Asiatic society* 397-412, 2 pl., 1938. ISIS

Pfister, R. Coqs sassanides. *Revue des arts asiatiques* 12, 40-7, 4 pl., 5 fig., 1938. ISIS

14. — ISLAM (*also Arabia*)

Adnan, Abd-ul-Hak. La science chez les turcs ottomans du commencement des temps modernes jusqu'aux premières années du XVII[e] siècle. *Archeion* 21, 35-61, 1938. ISIS

Bayatlı, Osman. Bergamada Şifali otlar ve Lokman Hekim (Medicinal herbs in Pergamum and Lokman Hekim). 47 p. İzmir, 1938 (in Turkish). ISIS

This work is a collection of names of herbs in the folk medicine of the vicinity of Pergamum. The words are arranged in alphabetical order and represent the terminology of Bergama, a region where stories of Asclepios and Lokman were kept alive for a long period. A. S.

Brunschvig, Robert. Sur les mesures tunisiennes de capacité au commencement du XVII^e siècle. *Annales de l'Institut d'études orientales* 3, 74-88, 1937. ISIS

Grant, Christina Phelps. The Syrian desert. Caravans, travel and exploration. XV + 410 p., 16 pl., 4 maps. London, BLACK, 1937. ISIS

Reviewed by GEORGE SARTON, *Isis* 29, 143-45, 1938.

Keskin, Refik Münür; Saglik, Saim. A sketch of the history of gynecology and obstetrics in Turkey. *Bulletin of the Institute of the history of medicine* 6, 899-906, 4 fig., 1938. ISIS

Kiernan, Reginald Hugh. The unveiling of Arabia. The story of Arabian travel and discovery. 360 p., 31 ill., 13 maps. London, HARRAP, 1937. ISIS

Reviewed by GEORGE SARTON, *Isis* 29, 143-45, 1938.

Kleinhans, Arduinus. Historia studii linguae arabicae et collegii missionum ordinis fratrum minorum in conventu ad S. Petrum in Monte Aureo Romae erecti. Tomus unicus, XX + 508 p. (Biblioteca bio-bibliografica della Terra Santa e dell'Oriente Francescano. Nuova serie — documenti, diretta dal P. GIROLAMO GOLUBOVICH, 13). Firenze, ZUARACCHI, 1930. ISIS

Reviewed by GEORGE SARTON, *Isis* 29, 189-91, 1938.

Mayer, L. A. Annual bibliography of Islamic art and archaeology. (India excepted). Vol. II, 1936, IX + 77 p. Jerusalem, DIVAN, 1938. ISIS

Pfister, R. L'introduction du coton en Égypte musulmane. *Revue des arts asiatiques* 11, 167-72, 1 pl., 1937. ISIS

Poliak, A. N. L'arabisation de l'orient sémitique. *Revue des études islamiques* 35-63, 1938. ISIS

Tresse, R. Le pèlerinage syrien aux villes saintes de l'Islam. VIII + 387 p., pls. Paris, CHAUMETTE, 1937. ISIS

Étude impartiale et fort bien documentée du pèlerinage de Damas à la Mecque, son histoire et son organisation. Elle nous aide à comprendre l'anarchie bédouine et arabe, telle que IBN KHALDOUN l'avait déjà décrite. Pendant de longs siècles, par exemple durant toute la durée du régime turc

(1517-1918) les Bédouins, quoique musulmans, n'ont cessé d'exploiter les pèlerins de leur propre religion, et souvent de les maltraiter et les tuer. Leur hostilité était si stupide qu'ils étaient toujours prêts à sacrifier leurs avantages lointains, pour satisfaire les convoitises et les rancunes du moment. C'est pourquoi je parle d'anarchie bédouine, une anarchie foncière, apparemment inguérissable. G. S.

Ünver, A. Süheyl. Les leçons en Turc au Moyen-âge. *Tedavi klinigi ve laboratuvari* 7, no. 27, 6-9, 1938 (in Turkisch with French summary). ISIS

IV. — NEW WORLD AND AFRICA

(*a*) AMERICA

Boggs, S. Whittemore. The map of Latin America by treaty. *Proceedings of the American philosophical society* 79, 399-410, 4 fig., 1938. ISIS

Hall, Máximo Soto. La medicina, la terapéutica y la higiene entre los mayas. *Publicaciones de la cátedra de historia de la medicina* 1, 129-54, Buenos Aires, 1938. ISIS

Kempton, J. H. Maize—our heritage from the Indian. *Annual report of the Smithsonian Institution, for the year ending June* 30, 1937, p. 385-408, 30 pl., 3 fig., 1938. ISIS

Lothrop, S. K. Gold and silver from southern Peru and Bolivia. *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 67, 305-25, 1937. ISIS

Ludendorff, H. Astronomische Inschriften in Palenque (Untersuchungen zur Astronomie der Maya, Nr. 12). *Abhandlungen der Preussischen Akademie der Wissenschaften*, physikalisch-mathem. Klasse, Nr. 1, 1938, 60 p., 4 pl., Berlin, 1938. ISIS

Verrill, A. Hyatt; Barrett, Otis W. Food America gave the world. XVI + 289 p., 10 pl. Boston, PAGE, 1937. ISIS

Reviewed by CONWAY ZIRKLE, *Isis* 29, 153-55, 1938.

Wagner, Henry Raup. The cartography of the Northwest coast of America to the year 1800. 2 vols., XI + 270 p.; V + p. 271-543. Berkeley, Univ. of California press, 1937. ISIS

Reviewed by HUNTER MILLER, *American historical review* 44, 132-34, 1938; and by E. HEAWOOD, *Geographical journal* 91, 374-76, 1938.

Wedel, Waldo R. The direct-historical approach in Pawnee archeology. 21 p., 6 pl. Smithsonian miscellaneous collections, 97, Washington, D.C., 1938. ISIS

(*b*) OCEANIA

Ashley-Montagu, M. F. Coming into being among the Australian aborigines. (Foreword by B. MALINOWSKI). 362 p. London, ROUTLEDGE, 1937. ISIS

Reviewed by CONWAY ZIRKLE, *Isis* 29, 192-94, 1938.

Leahy, Michael J.; Crain, Maurice. The land that time forgot. VII + 274 p. New York, FUNK & WAGNALLS, 1937 ($3.00). ISIS

An extremely interesting account of the opening up of unexplored territory in New Guinea and of the discovery of hitherto unknown tribes. The top photograph facing page 73 is remarkable for the fact that it shows a native bridge, across the Gauil River, built entirely of fibre upon the combination of the cantilever and suspension principles. Unquestionably this is the most remarkable engineering achievement on the part of a primitive people that has ever been published; and this illustration raises a very large number of questions, chief among which is whether we have here—or not—a case of independent invention. It appears to be highly improbable that this method of bridge-building was acquired from some outside source.

M. F. A.-M.

(*c*) AFRICA (*outside Egypt and Islam*)

Schapera, I. The early Cape Hottentots. XV + 309 p. + X p. Cape Town, Van Riebeeck Society, 1933. ISIS

This book, edited by one of our best authorities on the Bushmen and Hottentots, brings together the original texts of three of the most celebrated and among the earliest accounts of the Bushmen and Hottentots of South Africa. The works here made conveniently available are the Dutch *Kaffrarie, of Lant der Hottentots* (Kaffraria, or Land of the Hottentots) by OLFERT DAPPER (1636-?), first published at Amsterdam in 1668, and now for the first time rendered into English in extenso by Dr. SCHAPERA; the *Schediasma de Promontorio Bonae Spei* (An account of the Cape of Good Hope) by WILHELM TEN RHYNE (1649-1700), first published at Schaffhausen in 1686 and now made available in a new and complete translation by BENJAMIN FARRINGTON; the *Gentis Hottentotten nuncupatae descriptio* (An account of the Hottentots), by J. G. DE GREVENBROEK (1644?-1724?), now for the first time printed in the original Latin and in the English translation of Professor FARRINGTON. Each work is supplied with a foreword and the volume opens with an introduction by the editor. The notes to each work are by Dr. SCHAPERA, while a few are supplied by Professor FARRINGTON.

The translations are extremely readable. There is an index of authors and works cited and a bibliography. With regard to W. TEN RHYNE, see *Isis* 28, 192. M. F. A.-M.

PART III

SYSTEMATIC CLASSIFICATION

I. — SCIENCE IN GENERAL

16. — HISTORY OF SCIENCE

Armstrong, Anthony. Science in the army. A brief account of the scientific training and technical work of the soldier to-day, as illustrated by a special war office exhibition held at the Science Museum—November 1938—February 1939. 20 p., frontispiece (Board of education, Science Museum). London, His Majesty's stationery office, 1938 (6d.). ISIS

Collinder, M. Une cartothèque générale concernant l'histoire des sciences en voie d'élaboration sous les auspices de l'Académie pour l'histoire de l'astronomie de Lund. Congrès mondial de la documentation universelle, Paris, 16-21 août 1937, Texte des communications, p. 70-2. ISIS

Dannemann, Friedrich. Über den Parallelismus in der Entwicklung der Naturwissenschaften und der Heilkunde nebst einigen Vorbemerkungen über die Einführung der Geschichte der Naturwissenschaften und ihrer Anwendungen in den Hochschulunterricht. *Essays presented to* KARL SUDHOFF, p. 349-68, Zurich, 1924. ISIS

(History of science society). Account of the Indianapolis meeting of HSS, 1937, and Report of the secretary-treasurer. *Isis* 29, 301-03, 1938. ISIS

(Isis). Editorial board of *Isis*. *Isis* 29, 102-03, 1938. ISIS

Apropos of the election of DANA B. DURAND and ROBERT K. MERTON.

(Isis). Report for 1937. *Isis* 29, 304-05, 1938. ISIS

Mieli, Aldo. La documentation en " histoire des sciences." Congrès mondial de la documentation universelle, Paris, 16-21 août 1937, Texte des communications, p. 238-40. ISIS

Mieli, Aldo. Passato ed avvenire. Considerazioni poste come prefazione al volume XXI dell'*Archivio di storia della scienza* (*Archeion*). *Archeion* 21, 1-9, 1938. ISIS

(Paris, Université de). Institut d'histoire des sciences et des techniques. Rapport sur l'activité de l'Institut pendant l'année scolaire 1937-1938. *Ann. de l'Univ. de Paris*, 325-32, 1938. ISIS

Rosenfeld, Léon. Remarques sur la question des précurseurs. *Archeion* 21, 74-83, 1938. ISIS

Sarton, George. Fifty-third critical bibliography of the history and philosophy of science and of the history of civilization (to end of January 1938—with special reference to sections 31 to 33). *Isis* 29, 204-300, 1938. ISIS

" This fifty-third bibliography contains about 540 items of which 95 deal with sections 31 to 33. They have been kindly contributed by fifteen scholars belonging to four different countries."

Sarton, George. Preface to Volume twenty-nine... primum herbam deinde spicam deinde plenum frumentum in spica. *Isis* 29, 9-14, 1938. ISIS

Sokol, Anthony Eugene; Nye, Helena May. Berühmte Forscher und ihre Beiträge; ein wissenschaftliches Lesebuch. 595 p. New York, American Book Co., 1938 ($ 2.50). ISIS

Professors SOKOL and NYE are to be complimented on a splendid new reader for students of scientific German. Most special readers for these students consist of a series of extracts, usually graded in difficulty, taken from current books and journals dealing with the various sciences, the aim of which is to give the student a reading knowledge of German for his special science. The selections are usually fragmentary and because they have been torn from their context often lack interest. The compilers of this volume have happily avoided this fault. They have borrowed complete chapters from the writings of well known historians of science adding to them vocabularies and explanatory notes. The writings of SIGERIST, DE KRUIF, ALMQUIST and GUMPERT have been utilized to produce a volume which students will want to keep. 40 chapters which include HIPPOCRATES, GALEN, PARACELSUS, VESALIUS, GALILEI, COPERNICUS, NEWTON, EHRLICH, CUSHING and HABER take the student by way of biography over most of

the high spots in the history of science. The student who faithfully reads this volume not only will increase his mastery of German but will have learned a good bit of the history of science.

Two faults however must be mentioned. The arrangement of chapters is very poor. Chronology has been neglected with the result that a chapter on contemporary HARVEY CUSHING precedes an account of CARL VON LINNE. And ARISTOTLE and other Greek naturalists follow CHARLES DARWIN. In reprinting as a unit the selections from each of the authors from whom they have borrowed, the compilers have scrambled their dates. Since, as Drs. SOKOL and NYE point out in their preface, no attempt was made to arrange the readings in order of language difficulty (leaving that task to the teacher) there seems to be no obvious reason for not following a strict chronologic sequence. This is really a serious defect in an otherwise admirable volume. Furthermore, a short list of additional readings could have been added. M. C. I.

Tannery, Paul (1843-1904). Mémoires scientifiques, publiés par J. L. HEIBERG & H. G. ZEUTHEN. XIV, Correspondance. Éditée par A. DIÈS. XIV + 864 p., 5 pl. Paris, GAUTHIER-VILLARS, 1937. ISIS

Reviewed by GEORGE SARTON, *Isis* 29, 157-58, 1938.

17. — ORGANIZATION OF SCIENCE

(Internal organization is meant, see Isis 1, 195. *For external organization, national or international, see section* 55)

Bossière, Claude-Georges. Les chemins de la découverte. *Le Temps* 78, I. 19 juillet, p.8; II. 26 juillet, p. 6; III., 28 juillet, p. 8; IV. 2 août, p. 6; V. 3 août, p. 8; VI. 5 août, p. 6; VII. 6 août, p. 6; VIII. 7 août, p. 6; IX. 9 août, p. 6; X. 14 août, p. 6; XI. 22 août, p. 6; XII. 29 août, p. 6, 1938. ISIS

" Quelles sont les qualités primordiales que doivent posséder les chercheurs pour faire des découvertes scientifiques? Un enseignement approprié permet-il d'acquérir des qualités, ou des dons innés sont-ils indispensables? Telles sont les questions que nous avons posées à des savants français et étrangers dont les travaux appartiennent à toutes les branches de la science... Nous avons demandé, en outre, à nos éminents interlocuteurs quels sont, à leur avis, les meilleurs moyens d'encourager, de stimuler les chercheurs, pour que leurs efforts aboutissent à une découverte, petite ou grande, mais profitable au progrès scientifique." Interviews et textes d'ÉMILE PICARD, IRÈNE JOLIOT-CURIE, LUCIEN CUÉNOT, RENÉ LERICHE, CHARLES PÉREZ, ROBERT A. MILLIKAN, SVEN HEDIN, ERNEST ESCLANGON, AUGUSTE LUMIÈRE, LOUIS BLARINGHEM, PAUL SABATIER, LOUIS DE BROGLIE, LUCIE RANDOIN, PAUL PELSENEER, G. RAMON, JULES RICHARD, E.-D. ADRIAN, MAURICE D'OCAGNE, CHARLES FABRY, LÉON GUILLET, ALEXIS CARREL, PIETER ZEEMAN, DOCTEUR TOULOUSE, MAURICE LUGEON, FRANÇOIS CANAC, GEORGES CLAUDE et MAURICE JAVILLIER. J. P.

Cattell, J. McKeen; Cattell, Jacques. American men of science. Ed. 6. VIII + 1608 p. New York, Science Press, 1938 ($ 12.00). ISIS

The sixth edition of this indispensible and authentic list of American men of science contains about 28,000 names, a seven-fold increase in 32 years over the 4,000 of the first edition (1906), and of 6,000 over the number in the fifth edition of five years ago. With this increase in number there has gone an ever increasing diversification of the specializations in both the pure and applied sciences. The inclusion of brief biographical data regarding education, degrees, positions, research interests, medals, honors, special appointments, military service, and memberships in scientific societies, makes this recurrent record a source book in the history of science of lasting value and primary importance as well as a handy reference work of wide usefulness. The useful analytical summaries of earlier editions are omitted in this, presumably for lack of space. C. A. K.

Compton, Karl T. The social implications of scientific discovery. 33 p. Jayne memorial lecture delivered at the American philosophical society, Philadelphia 1938. ISIS

Gruenberg, Benjamin C. The scientific temper and social values. *Science education* 22, 128-33, 1938. ISIS

Merton, Robert K. Science and the social order. *Philosophy of science* 5, 321-37, 1938. ISIS

" The main conclusions of this paper may be briefly summarized. There exists a latent and active hostility toward science in many societies, although the extent of this antagonism cannot yet be established. The prestige which science has acquired within the last three centuries is so great that actions curtailing its scope or repudiating it in part are usually coupled with affirmation of the undisturbed integrity of science or ' the rebirth of true science.' These verbal respects to the pro-science sentiment are frequently at variance with the behavior of those who pay them. In part, the anti-science movement derives from the conflict between the ethos of science and of other social institutions. A corollary of this proposition is that contemporary revolts against science are *formally* similar to previous revolts, although the *concrete* sources are different. Conflict arises when the social effects of applying scientific knowledge are deemed undesirable, when the scientist's scepticism is directed toward the basic values of other institutions, when the expansion of political or religious or economic authority limits the autonomy of the scientist, when anti-intellectualism questions the value and integrity of science and when non-scientific criteria of eligibility for scientific research are introduced. This paper does not purport to present a program for action in order to withstand the current threats to the development and autonomy of science. It may be suggested, however, that as long as the locus of social power resides in any one institution other than science and as long as scientists themselves are uncertain of their primary loyalty, their position becomes tenuous and uncertain."

Ridgway, John L. Scientific illustration. XIV + 173 p. Stanford University press, 1938 ($ 4.00). ISIS

The place of the artist in the history of science is a very high one. In this book one of the best known scientific illustrators in America (See *Science*, 12 Aug. 1938, vol. 88, 145-6, for an account of his work) has written a very attractive account of the principles and best practices in the selection of appropriate scientific illustrative material and its treatment. The volume will be of great value not alone to the artist but also to the scientific writer in helping him to plan his illustrations. M. F. A.-M.

(Royal Society). Notes and records of the Royal Society of London (No. 1, April 1938). ISIS

It is planned that activities of the Royal Society together with information of historical interest be reported by the Society in *Notes and records* in April and October of each year. *Notes and records* contains obituary details, notes on elections of fellows, gifts, celebrations, appointments, and lectureships.

The success of the new venture seems fully assured, to judge from the character of the first number. This contains an announcement of the Pilgrim Trust lecture sponsored jointly at the suggestion of L. J. HENDERSON by the Royal Society and the National Academy of Science. The lecture will be given alternately in England and the United States. An account of the anniversary dinner is included with extracts from the address of Sir JOHN SIMON. C. S. SHERRINGTON contributes an admirable account of the Royal Society library which began with the foundation of the Society (1662). In 1667 the Society received from the DUKE OF NORFOLK the library of Arundel House, one of the finest in England. The non-scientific books of this library have been transferred to other collections or sold to establish the Arundel fund now used to maintain the library. SHERRINGTON comments particularly upon the richness of the library in manuscripts. These include Newtoniana, Malpighiana, many letters from LEEUWENHOEK, PRIESTLEY, BOYLE, OLDENBURG, and the manuscripts of papers communicated to the Society. In an account of the foundation of the Royal Society in 1662, there is a review of the suggestion of YOUNG on the influence of COMENIUS on the origin of the Royal Society and DOROTHY STIMSON's later analysis (*Isis* 23, 1935). The first issue of *Notes and records* closes with an analysis of the number and character of the Fellows. C. D. L.

18. — PHILOSOPHY OF SCIENCE

Burdell, Edwin Sharp. Scientific humanism. *School and society* 48, 611-19, 1938. ISIS

Address on the occasion of the installation of Dr. BURDELL as the director of Cooper Union, New York City, November 3, 1938.

Dantzig, Tobias. Aspects of science. XI + 285 p. New York, MACMILLAN, 1937. ISIS

Reviewed by RICHARD HOCKING, *Isis* 29, 155-57, 1938.

Dingle, Herbert. Through science to philosophy. New York, Oxford Univ. Press, 1937. ISIS

Reviewed by BENJAMIN GINZBURG, *Isis* 29, 160-63, 1938.

George, William H. The scientist in action. IX + 355 p. London, WILLIAMS & NORGATE, 1936. ISIS

Reviewed by ROBERT K. MERTON, *Isis* 29, 159, 1938.

Lenzen, Victor F. Procedures of empirical science. International encyclopedia of unified science, vol. 1, no. 5, VII + 59 p. University of Chicago Press, 1938. ISIS

Neurath, Otto. The departmentalization of unified science. *Erkenntnis* 7, 240-46, 1938. ISIS

Picard, Émile. Quelques vues générales sur la science. *Bull. des sc. math.* 62, 163-66, 1938. ISIS

Picard, Émile. Quelques vues sur la science. *Rev. scientifique* 269-70, 15 juillet, 1938. ISIS

Rayleigh, Lord. Vision in nature and vision aided by science; science and warfare. *Science* 88, 175-81, 204-08, 1938. ISIS

Address of the President of the British Association for the Advancement of Science, Cambridge, August 1938.

Strong, Edward W. Procedures and metaphysics : a study in the philosophy of mathematical-physical science in the sixteenth and seventeenth centuries. VIII + 301 p. Berkeley, University of California Press, 1936. ISIS

Reviewed by FRANCIS R. JOHNSON, *Isis* 29, 110-13, 1938.

Wallace, R. C. The changing values of science. *Science* 88, 265-71, 1938. ISIS

The Maiben lecture delivered at the meeting of the American association for the advancement of science, Ottawa, June 30, 1938.

II. — FORMAL SCIENCES (*knowledge of forms*)

19. — LOGIC AND THEORY OF KNOWLEDGE

Carnap, Rudolf. The logical syntax of language. Translated from the German by AMETHE SMEATON (COUNTESS VON ZEPPELIN). XVI + 352 p. New York, HARCOURT, BRACE, 1937. ISIS

Reviewed by HENRY S. LEONARD, *Isis* 29, 163-67, 1938.

20. — MATHEMATICS

Bouligand, G. Quelques aspects des conférences internationales des sciences mathématiques (Genève, 1933-1937). *Rev. scientifique* 221-26, 15 juin 1938. ISIS

Cavallaro, Vincenzo G. Storia della geometria del triangolo in Italia. *Il bollettino di matematica* 34, XLI-XLIV, Settembre 1938. ISIS

Hogben, Lancelot. Matematik for Millioner. En populaer Laesebog til Selvstudium. Paa dansk ved IVER GUDME. Med faglig Bistand af mag. scient. POUL W. MARKE. 620 S. København, Gyldendal, 1938. ISIS

Reviewed by O. NEUGEBAUER, *Matematisk Tidsskrift* A, no. 2-3, 50-7, 1938. The English edition was reviewed in *Isis* 28, 138.

Ivins, William M., jr. On the rationalization of sight. With an examination of three Renaissance texts on perspective. 53 p., 37 fig. New York, Metropolitan Museum of Art papers, no. 8, 1938. ($ 2.00). ISIS

Very beautiful publication including a facsimile reprint of VIATOR's work of 1505 and a study on the three outstanding Renaissance texts on perspective. " ALBERTI's book, the *Della pittura libri tre*, written in 1435-1436, is generally acknowledged to be the earliest statement of a logically coherent and pictorially adequate scheme of perspective representation. The construction worked out by ALBERTI, and used after him by generations of Italian artists, is currently known as the ' costruzione legittima.' VIATOR's book, the *De artificiali perspectiva*, published at Toul in 1505 and pirated at Nuremberg in 1509, contains the first statement of the familiar ' three point ' or ' distance ' method. DÜRER's book, the *Unterweysung der Messung*, first published in 1525, was for several generations the most advanced German authority on the subject." G. S.

Karpinski, Louis C. The obligations of a university teacher who writes popular science. Illustrated by " Mathematics for the million." *School and society* 48, 338-40, 1938. ISIS

Kowalewski, Gerhard. Grosse Mathematiker. Eine Wanderung durch die Geschichte der Mathematik vom Altertum bis zur Neuzeit. 300 p. München, LEHMANN, 1938. ISIS

Reviewed by E. J. DIJKSTERHUIS, *Quell. u. Stud. z. Gesch. d. Math., Astr., u. Phys.* Abtg. B : Studien, 4, 415-21. 1938.

Loria, Gino. Remarques sur les équations algébriques non rationnelles. *Mathesis* 52, 129-31, 1938. ISIS

Miller, G. A. The history of mathematics forty years ago. *Science* 88, 375, 1938. ISIS

Pointing out historical errors in the *Encyklopädie der mathematischen Wissenschaften*. G. S.

Pétard, H. A contribution to the mathematical theory of big game hunting. *American mathematical monthly* 45, 446-47, 1938. ISIS

Witty, amusing, and to boot instructive. G. S.

Smith, David Eugene. Possible boundaries in the early history of mathematics. *American mathematical monthly* 45, 511-15, 1938. ISIS

Tropfke, Johannes. Geschichte der Elementar-Mathematik. Dritter Band : Proportionen, Gleichungen. Dritte, verbesserte und vermehrte Auflage. IV + 239 p. Berlin, DE GRUYTER, 1937. ISIS

Reviewed by SOLOMON GANDZ, *Isis* 29, 167-69, 1938.

21. — STATISTICS

(History and methods. Tables and generalities. For the applications, refer to the sciences to which they are applied)

Funkhouser, H. Gray. Historical development of the graphical representation of statistical data. *Osiris*, studies on the history and philosophy of science 3, p. 269-404, 1937. ISIS

Reviewed by J. M. KEYNES, *Economic journal* 48, 281-82, 1938; and by J. M. THOMPSON, *American mathematical monthly* 45, 541-42, 1938.

III. — PHYSICAL SCIENCES *(Knowledge of inorganic nature)*

22. — MECHANICS

(Including celestial and atomical mechanics)

Heyl, Paul R. What is gravitation? *Scientific monthly* 47, 114-23, 1938. ISIS

A very valuable study. G. S.

Mineur, Henri. Qu'est-ce que le temps? *La nature* 53-60, 106-11, 157-66, 245-50, 1934. ISIS

23. — ASTRONOMY

Evershed, (Mrs.) John. " Who's who in the moon. Notes on the names of all lunar formations adopted in 1935 by the International Astronomical Union, " *Memoirs of the British astronomical association*, Historical section, vol. 34, part 1, 3-130, 2 pl., 1938. ISIS

Contains brief biographical notes on *all* persons whose names have been applied to lunar formations. D. N.

Lundmark, Knut. Was the Crab Nebula formed by a supernova in 1054 A.D.? *Festskrift tillägnad östen Bergstrand*, p. 89-106, Uppsala, ALMQVIST & WIKSELL, 1938. ISIS

Neugebauer, O. Untersuchungen zur antiken Astronomie V. Der Halleysche " Saros " und andere Ergänzungen zu UAA III. *Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik*, Abtg. B : Studien 4, 407-11, 1938. ISIS

Rumrill, H. B. The revival of popular interest in astronomy. *Popular astronomy* 45, 7 p., 1937. ISIS

Rumrill, H. B. Star name pronunciation. *Publications of the Astronomical Society of the Pacific* 48, 139-54, 1936. ISIS

Saintyves, P. (i.e., **Émile Nourry** (1870-1935). L'astrologie populaire étudiée spécialement dans les doctrines et les traditions relatives à l'influence de la lune. Essai sur la méthode dans l'étude du folklore des opinions et des croyances. 464 p. Paris, NOURRY, 1937 (60 fr.). ISIS

Publication posthume due à la piété conjugale de M^me^ NOURRY qui a fait tout ce qu'elle a pu pour la rendre aussi parfaite que possible. Par exemple, elle a pris le soin d'y ajouter un excellent index. SAINTYVES était extrêmement érudit mais il ne connaissait l'histoire des sciences qu'assez mal, et la science moderne presque pas. Cette ignorance technique se révèle surtout dans les chapitres consacrés aux marées aériennes, et l'action de la lune sur les animaux marins. Voir à ce sujet mon article " Lunar influences on living things " (*Isis* 1939). Des appendices sont consacrés à l'histoire et la bibliographie des almanachs, et à la notion de temps et d'éternité dans la magie et la religion. La documentation de l'auteur est riche, mais trop exclusivement française. Par exemple, il ne connaissait point les travaux italiens (R. ALMAGIÀ, P. REVELLI) sur les marées, ni les travaux allemands de G. HELLMANN sur l'histoire de la météorologie et des almanachs. Cependant ce livre sera fort utile et nous en sommes très reconnaissants à M. et M^me^ NOURRY-SAINTYVES. Voir dans la section ethnologique ci-dessous la note consacrée au regretté P. SAINTYVES. G. S.

Strycker, É. de. La baleine, l'aveugle et le chat dans un texte astrologique. *Rev. belge de philologie et d'histoire* 17, 222-25, 1938. ISIS

Wallace, Lewis A. R. The luni-solar calendar. *Meddelande från Lunds astronomiska Observatorium*, ser. II, nr. 102, Historical notes and papers, no. 14, 1938. ISIS

Wilson, P. W. The romance of the calendar. 351 p., 13 fig. London, ALLEN and UNWIN, 1937. ISIS

Reviewed by A. POGO, *Isis* 29, 169-72, 1938.

24. — PHYSICS

Avery, Madalyn. Household physics. A textbook for college students in home economics. XVI + 439 p., 378 fig. New York, MACMILLAN, 1938 ($ 3.50). ISIS

" This book is intended for college students in home economics. It is a text in applied physics in which the applications have been chosen from the daily household life and from the various commercial fields which home economics students enter. The rapid development of various kinds of equipment for use in the home has made it imperative that the housewife understand the principles underlying their operation. The aim has been to present the fundamentals of physics in a manner which will show their close relationship to the problems of the home, and also to treat the subject in such a way as to form a background for those students who intend to enter the commercial field. Subject matter has been selected which has proven to be valuable and interesting to the thousands of young women who have taken the course at this institution." [Kansas State College of agriculture and applied science.]

Compton, Arthur H. Physics and the future. *Science* 88, 115-21, 1938. ISIS

Jeans, Sir James. Science and music. X + 258 p. New York, MACMILLAN, 1937. ISIS

Reviewed by V. F. LENZEN, *Isis* 29, 172, 1938.

Millikan, Robert Andrews; Gale, Henry Gordon; Edwards, Charles William. A manual of experiments to accompany a first course in physics for colleges. Revised edition. VI + 221 p., 134 fig. Boston, GINN, 1938 ($ 1.00). ISIS

How I wish I could have used such a convenient and rich manual as this one when I was a student! G. S.

Newhall, Beaumont. Photography, a short critical history. 220 p., 95 pl. New York, Museum of modern art, 1938 ($ 3.00). ISIS

This is the second edition of the Museum of modern art's *Photography* 1839-1937, reviewed in *Isis* 30, 127, now issued under a more suitable title. The text has been revised, and considerable new data have been included in the Biographical index which takes the place of the now obsolete catalog lists of the original publication. This book can now be warmly recommended to any one desiring a brief but balanced account of the general history of photography. D. N.

Schurmann, Pablo F. Evolución de las teorías de la naturaleza de la luz. El nacimiento de la termodinámica. 91 p. Montevideo, MONTEVERDE, 1938. ISIS

Schurmann, Paul F. Historia de la física. XVI + 1359 p., 82 ills. (Anales de la Universidad, entrega no. 139). Montevideo, 1936. ISIS

Reviewed by MARY ELVIRA WEEKS, *Isis* 29, 172-76, 1938.

25. — CHEMISTRY, PHYSIO-CHEMISTRY INDUSTRIAL CHEMISTRY

Baekeland, L. H. Science and industry. *Chemistry & industry* 57, 679-82, 1938. ISIS

" Messel lecture delivered by Dr. BAEKELAND on receipt of the Messel medal at the annual meeting of the Society in Canada on June 21, 1938." Very interesting lecture containing inter alia a brief history of industrial chemistry and an account of the work done by FRANCIS PATRICK GARVAN and of his " Chemical foundation." G. S.

Collinder, Per. On the historical origins of atomism. *Meddelande från Lunds astronomiska Observatorium*, ser. II, nr. 91, Historical notes and papers, no. 12, 8 p., 1938. ISIS

Dony-Hénault, Octave; Decroly, Claude. Recherches théoriques et expérimentales sur la métallurgie thermique du zinc 1931-1938. 269 p., frontispiece, 57 fig. Liége, THONE, 1938. ISIS

Ce travail ne concerne guère l'historien de la chimie, mais l'auteur y a ajouté un portrait " du chanoine JEAN-JACQUES-DANIEL DONY, dit l'abbé DONY, né à Liége en 1759, y décédé en 1819, et qui au faubourg Saint-Léonard de cette ville réussit, après de grands efforts, à jeter le fondement du procédé d'extraction du zinc de la blende, dit à cause de cela ' procédé égeois.' Les procédés dits rhénans et silésiens ne sont que des modifications morphologiques du procédé liégeois mis en œuvre à une échelle

toujours croissante, au cours du XIX^e siècle, par la Société de la Vieille-Montagne puis, à son exemple, par quelques autres qui subsistent encore aujourd'hui."

Färber, Eduard. The development of protein chemistry. *Journal of chemical education* 15, 434-44, 2 fig., 1938. ISIS

Findlay, Alexander. A hundred years of chemistry. 352 p., 11 fig. New York, MACMILLAN, 1937. ISIS

Reviewed by MARY ELVIRA WEEKS, *Isis* 29, 176-79, 1938.

Morgan, Sir Gilbert T.; Pratt, David Doig. British chemical industry, its rise and development. XII + 387 p., 32 pl., 79 fig. New York, LONGMANS, GREEN, 1938. ISIS

" This volume incorporates the substance of a series of public lectures delivered at the University College of Wales, Aberystwyth, during the session 1935-6. By a fortunate coincidence the period during which the lectures were delivered (November 19 to 26, 1935) came immediately at the close of the International exhibition held in Brussels during that year. At this Exhibition one of the most attractive displays in the British pavilion was a selection of chemical products illustrating the current activities of British chemical manufacturers. This exhibit was a collective one arranged by the Association of British chemical manufacturers on behalf of its constituent firms and when the selection had returned to England we were able through the courtesy of the Association and the kind services of its general manager, J. DAVIDSON PRATT, to display the greater part of these distinctive specimens in the EDWARD DAVIES chemical laboratory, Aberystwyth, where they were inspected by many appreciative visitors from all the surrounding districts. The presence of this national collection of chemical exhibits furnished a striking illustration of the subject matter of the lecture course, the title of which has been retained for the present volume. The task of surveying the rise of British chemical industry from its early beginnings to the present stage of development is well-nigh impossible in any treatise of modest size. We are only too conscious of inadequate reference to certain manufactures and of complete omission in regard to others. That such shortcomings are inevitable will be realized on considering what may be included under the heading of chemical industry taken in its widest sense. This category would comprehend not only the exceedingly varied trades in heavy and fine chemicals but also vast undertakings dealing with food and drink, with clothing and with shelter. In the course of time these great enterprises which supply the primary needs of the nation have all of them taken on a chemical aspect, but we have perforce been compelled to omit them from our survey."

Noyes, Arthur A.; Sherrill, Miles S. A course of study in chemical principles. Second edition, rewritten. XXV + 554 p., 7 fig. New York, MACMILLAN, 1938 ($ 5.00). ISIS

" A complete revision of this course of study in the laws and theories of chemistry was planned before the death of ARTHUR A. NOYES [in 1936]." ... " The first and second laws of thermodynamics are now presented and thoroughly discussed at the beginning of the book instead of at the end. By this rearrangement, thermochemistry is fundamentally treated at an early stage through application of the first law. Furthermore, the foundation is laid at the beginning of the subsequent thermodynamic treatment of the laws of chemical and physico-chemical equilibrium. In this treatment, progressively pursued throughout the book, the repeated application of the second law results for the student in an increasingly better comprehension of its basic concepts. The system of thermodynamics thus developed is made rigid by the adoption of the activity concept of G. N. LEWIS. In the final chapter the third law of thermodynamics is presented and applied." ... " The kinetic theory is here more fully developed than in the first edition. The essential features of the DEBYE-HÜCKEL ion-attraction theory are presented. With the aid of this theory, equations are derived for calculating the activity-coefficients and the molar-coefficients (or osmotic-coefficients) of ions in dilute solutions."

Partington, J. R. A short history of chemistry. XIV + 386 p., ills. New York, MACMILLAN, 1937. ISIS

Reviewed by TENNEY L. DAVIS, *Isis* 29, 179-81, 1938.

Renaud, Paul. Nouvelle conception de l'inertie chimique. *Revue générale des sciences* 49, 375-82, 1938. ISIS

26. — TECHNOLOGY

(For mining, see 32. *Geology; for Industrial chemistry,* 25. *Chemistry. See also Arts and crafts under* 45)

Bardèche, Maurice; Brasillach, Robert. The history of motion pictures. Translated and edited by IRIS BARRY. XII + 412 p., ills. New York, NORTON, 1938 ($ 4.00). ISIS

The cinema offers an isolated example of an art form whose birth date can be set specifically. It is an interesting example to the historian of science of the immediate, if not the fullest, application of scientific discoveries to the realm of art. Of course, the motion picture has been exploited by scientists for scientific purposes as well. But the present volume concerns itself almost entirely with the development of the cinema as an art form and traces, country by country, and director by director, the growth of cinematic technique from the early work of DEMENY, MAREY, the LUMIÈRE brothers, and EDISON to the present masters of the sound film. What is to be desired, however, is not the present volume (although the present volume remains the best work of its sort now available) but a volume that would be better balanced in giving more space to the *history* of the technical development of the movies, and would not merely concentrate on the *exploitation* of this technical development.

It is of interest, as well, to note with the authors how powerful an influence in modern life the cinema has become (second only, in this reviewer's opinion, to the radio, a similar example of cultural exploitation of scientific discovery) since the first public or paying performance—that given in the Grand Café, Boulevard des Capucines, Paris on December 28, 1895. In addition to this influence, the tremendous allied industries which have been developed in connection with the cinema form a most fertile, if still virgin, field of investigation for the sociologist interested in the effect of scientific and technical discovery upon the contemporary world.

The development of the sound film affords a particularly interesting phenomenon as the " basic elements of sound-on-film recordings were known to physicists in both Europe and America, well before 1900. Due, however, to the infinitely small amount of sound energy available for audio reproduction, this knowledge was of no practical use. It was not until the decade following the World War, when the vacuum tube amplifier was perfected, that the art of sound-on-film recording and reproduction became commercially possible." The color film affords a contemporary example of the lag between the present cinematic product and the latest stage of scientific accomplishment. I. B. C.

(Cooper Union). The non-technical aspects of engineering education. A bibliography compiled by the Cooper Union library. *Cooper Union bulletin* no. 18, 10 p., Nov. 1938. ISIS

Darby, Henry Clifford; Ramsden, P. M. The middle level of the Fens and its reclamation. With maps of the Fenland, by EDWARD LYNAM. Reprinted from the *Victoria history of the counties of England*, Huntingdon III. 58 p. London, Saint Catherine press for the University of London, Institute of historical research, 1936. ISIS

Reviewed by E. HEAWOOD, *Geographical journal* 91, 364-65, 1938.

Desch, C. H. A chemist's view of metallurgy. Presidential address. *Journal of the Institute of metals* 62, 41-61, frontispiece, 1938. ISIS

Donkin, S. B. The society of civil engineers (Smeatonians). *Transactions of the Newcomen society* 17, 1936-37, p. 51-71, 1938. ISIS

Jenkins, Rhys. Industries of Herefordshire in bygone times. *Transactions of the Newcomen society* 17, 1936-37, p. 175-89, 1938. ISIS

Mayper, Joseph. Atlantic transportation today ! A centenary address. 28 p. The Newcomen society, American branch, 1938. ISIS

Roe, Joseph W. Interchangeable manufacture. *Transactions of the Newcomen society* 17, 1936-1937, p. 165-74, 1938. ISIS

Sherrington, C. E. R. A hundred years of inland transport. 376 p. (Hundred years series, 1830-1933). London, DUCKWORTH, 1934. ISIS

" The story of the phenomenal development of transport by road, rail and canal, during the last hundred years. The opening of the Liverpool and Manchester railway in 1830 inaugurated the era of steam for commercial transport : the passing of the Road and rail traffic Act and the London passenger transport Act in 1933 put an end to unrestrained competition by road and rail. Between these dates lies the change-over from almost medieval conditions of horse-traffic to the crowded speedways of to-day. No better authority could be found than Mr. SHERRINGTON of the Railway research service to recount all the remarkable incidents of this progress."

Smythe, J. A. Ancient Sussex iron blooms : a metallographic examination. *Transactions of the Newcomen society* 17, 1936-37, p. 197-203, 1938. ISIS

Vollgraff, J. A. Trirèmes et quinquérèmes. *Archeion* 21, 103-05, 1938. ISIS

Wroth, Lawrence C. The way of a ship : an essay on the literature of navigation science. XII + 92 p. Portland, Maine, SOUTHWORTH-ANTHOENSEN press, 1937. ISIS

Reviewed by E. G. R. TAYLOR, *Geographical journal*, 92, 89, 1938.

Young, J. W. Notes on the practical development of the oil engine. *Transactions of the Newcomen society* 17, 1936-37, 109-29, 1 fig., 1938. ISIS

IV. — BIOLOGICAL SCIENCES (*Knowledge of organic nature*)

27. — BIOLOGY (*Generalities, " Natural history "*)

Buchanan, Estelle D.; Buchanan, Robert Earle. Bacteriology for students in general and household science. Fourth edition. XV + 548 p., 245 fig. New York, MACMILLAN, 1938 ($3.50). ISIS

Contents : 1. Morphology, classification, and distribution of microörganisms; 2. Cultivation and observation of microörganisms; 3. Physiology of microörganisms; 4. Effects of organisms on their environment. Including fermentations; 5. Microörganisms and health.

There is an historical outline at the beginning (9 p.).

De Beer, G. R. Evolution. VIII + 351 p. New York, Oxford Univ. Press, 1938 ($ 5.00). ISIS

The twelve essays on aspects of evolutionary biology which comprise

this book are written by students and colleagues of E. S. GOODRICH and were presented to him on the occasion of his seventieth birthday. As Linacre professor of comparative anatomy and zoology in the University of Oxford, Professor GOODRICH has had a hand in educating a fairly large number of now famous biologists, and his contributions to zoology and comparative anatomy have been many and important. The standard of the individual essays contributed to this congratulatory volume is high, and each essay is in itself a contribution of importance. We can do no more than mention them here. Sir EDWARD POULTON, *Insect adaptation as evidence of evolution by natural selection.* J. S. HUXLEY, *The present standing of the theory of natural selection.* E. B. FORD, *The genetic basis of adaptation.* G. R. DE BEER, *Embryology and evolution.* J. B. S. HALDANE, *The nature of interspecific differences.* O. W. RICHARDS, *The formation of species.* A. M. CARR-SAUNDERS, *Human evolution and the control of its future.* C. ELTON, *Animal numbers and adaptation.* A. C. HARDY, *Change and choice : A study in pelagic ecology.* J. R. BAKER, *The evolution of breeding seasons.* J. Z. YOUNG, *The evolution of the nervous system and the relationship of organism and environment.* J. BRONTË GATENBY, *The evolution of the cytoplasmic apparatus of the cell.* H. G. THORNTON, *Bacterial strains, and variation.* H. P. GOODRICH, *Life-cycles of certain infusoria with observations on specificity in parasitic protozoa.* H. A. BAYLIS, *Helminths and evolution.* W. GARSTANG, *The descent of crustacea from trilobites, and their larval relations.* W. K. SPENCER, *Some aspects of evolution in echinodermata.* J. A. MOY-THOMAS, *The problem of the evolution of the dermal bones in fishes.* B. W. TUCKER, *Functional evolutionary morphology : the origin of birds.* A list of the scientific works of E. S. GOODRICH and an index follow. M.F.A.-M.

Lillie, Ralph S. The nature of organizing action. *American naturalist* 72, 389-415, 1938. ISIS

Yearbook of agriculture, 1936 and 1937. 1189 p.; 1497 p. Washington, D.C., U. S. Dept. of Agriculture, 1936, 1937. ISIS

Reviewed by CONWAY ZIRKLE, *Isis* 29, 182-83, 1938.

28. — BOTANY

(*Agronomy, Phytopathology, Palaeobotany*)

Baxa, Jakob. Die Zuckererzeugung, 1600-1850. 231 p., 48 fig. Jena, FISCHER, 1937. ISIS

Reviewed by MAX SPETER, *Isis* 29, 184-85, 1938.

Brooks, Jerome E. Tobacco. Its history, illustrated by the books, manuscripts and engravings in the library of GEORGE ARENTS, jr. together with an introductory essay, glossary and bibliographical notes. Vol. 1, large quarto, XVI + 544 p., ills. New York, ROSENBACH, 1937. ISIS

Reviewed by GEORGE SARTON, *Isis* 29, 186-88, 1938.

Delatte, A. *Herbarius*, recherches sur le cérémonial usité chez les anciens pour la cueillette des simples et des plantes magiques. Deuxième édition, revue et augmentée, illustrée de quatre planches hors-texte. 177 p. (Bibliothèque de la faculté de philosophie et lettres de l'Université de Liége, fasc. 81). Liége, 1938. ISIS

The first edition of this important work (Bruxelles-Paris 1936) was reviewed by C. ZIRKLE (*Isis* 27, 531-32). Says the author : " J'ai voulu d'abord étendre et approfondir mes premières recherches. Le lecteur qui prendra la peine de comparer les deux textes se rendra compte des importantes modifications qu'a entraînées cette nouvelle étude." G. S.

Gager, C. Stuart. Botanic gardens of the world, material for a history. *Brooklyn Botanic Garden Record*, 26, 149-353, 1937. ISIS

Reviewed by CONWAY ZIRKLE, *Isis* 29, 185, 1938.

Hayward, Herman E. The structure of economic plants. x + 674 p., 340 fig. New York, MACMILLAN, 1938 ($ 4.90). ISIS

" This book is an outgrowth of courses in plant anatomy offered at the University of Chicago since 1927. Much valuable anatomical work has been done in the form of monographs on specific plants, special studies of restricted scope, general studies of organography, and in studies incidental to research in physiology, pathology, pharmacology, and other fields of plant science. Discussions with those interested in applied botany, research workers and students, suggested the desirability of preparing a work which would bring together some of these investigations relating to the structure and developmental anatomy of a number of economic plants. In this book, the available data have been freely drawn upon, and at the conclusion of each chapter there is appended a selected list of citations from which material has been obtained." ... " The book has been organized in two parts, the first dealing with general plant anatomy, the second with the structure of a selected number of economic plants."

Lippmann, Edmund O. von. Nachträge zur " Geschichte des Zuckers." *Zeitschrift der Wirtschaftsgruppe Zuckerindustrie* 88, 359-70, 639-81, 702-32, 1938. ISIS

Dr. v. LIPPMANN's standard work on the history of sugar (2nd ed. 1929) was reviewed in *Isis* (13, 393-95). He published valuable additions in 1934, and now we are given a new series of them, which defies analysis. The author, now 82 years of age, is truly indefatigable. What a great example he is giving us all ! G. S.

True, Alfred Charles. A history of agricultural experimentation and research in the United States, 1607-1925. 321 p. (U.S.D.A. miscellaneous publications, no. 251). Washington, 1937. ISIS

Reviewed by C. Z., *Isis* 29, 183, 1938.

29. — ZOOLOGY

Blochet, E. Sur le phénix. *Le Muséon* 50, 123-44, 1937. ISIS

Messer, Harold Madison. An introduction to vertebrate anatomy. XVI + 406 p. New York, MACMILLAN, 1938 ($ 3.50). ISIS

Preface : " In the preparation of this text it has been the intent of the author to present an adequate but not too detailed account of vertebrate anatomy... The author lays no claim to originality for the details and long-known facts of vertebrate anatomy herein assembled. If he has been fortunate enough to have selected from a mass of details, those most essential, and if, in their presentation, he has been able to arrange these facts in such a way as to arouse the interest of the student, he will be quite content. The manner of treatment, by systems rather than by types, has been followed in the author's classes at Long Island University for a number of years, and has proved to be much more satisfactory than the older type-study method... An earnest effort has been made to obtain a relatively large number of original drawings. In their preparation a number of former students have been most helpful."

Osborn, Herbert. Fragments of entomological history, including some personal recollections of men and events. VII + 394 p., port., frontispiece, 47 pl. Columbus, Ohio, the Author, 1937. ISIS

Reviewed by CHARLES A. KOFOID, *Isis* 29, 183, 1938.

V. — SCIENCES OF THE EARTH

(implying knowledge of both organic and inorganic nature)

31. — GEOGRAPHY AND OCEANOGRAPHY

Cordeiro, Luciano. Questões historico-colóniais. Vol. 1, 424 p.; vol. 2, 314 p.; vol. 3, 386 p. Lisbõa, Agência geral das colónias, divisão de publicações e biblioteca, 1935-6. ISIS

Reviewed in *Geographical journal* 91, 568-69, 1938. Collected articles written in the second half of the century, mainly concerning the great figures of Portugal's age of expansion. C. W. A.

Dept, G. G. Chronique de géographie (1937). *Rev. des quest. scientif.* 4, 115-32, 1938. ISIS

Cette revue des recueils périodiques concernant la production géographique de 1937, comporte notamment les rubriques suivantes : histoire de la cartographie, histoire de la géographie, géographie historique. J. P.

Hennig, Richard. Terrae incognitae; eine Zusammenstellung und kritische Bewertung der wichtigsten vorkolumbischen Entdeckungsreisen an Hand der darüber vorliegenden Originalberichte. Vol. II, 200-1200 n. Chr. IX + 399 p. Leiden, BRILL, 1937. ISIS

Reviewed by DANA B. DURAND, *Isis* 29, 188-89, 1938.

Vallaux, Camille. Deux précurseurs de la géographie humaine : VOLNEY et CHARLES DARWIN. *Rev. de synthèse* 15, 81-93, 1938. ISIS

32. — GEOLOGY, MINERALOGY, PALAEONTOLOGY, MINING

(For palaeobotany, palaeozoology and palaeoanthropology, see respectively 28. *Botany,* 29. *Zoology and* 39. *Prehistory.)*

Forbes, R. J. History of petroleum. *Isis* 28, 465, 1938. ISIS

Stetson, Harlan T. Correlation of frequencies of seismic disturbances with the hour angle of the moon. Publications du Bureau central séismologique international, série A. : travaux scientifiques, fasc. 15, 16 p., 4 fig., 1937. ISIS

33. — METEOROLOGY, CLIMATOLOGY AND TERRESTRIAL PHYSICS

Chapman, S. The lunar tide in the earth's atmosphere. *Proceedings of the Royal society of London* 151, 105-17, 1935. ISIS

Pekeris, C. L. Atmospheric oscillations. *Proceedings of the Royal society of London* 158, 650-71, 1937. ISIS

VI. — ANTHROPOLOGICAL AND HISTORICAL SCIENCES

(Knowledge of man, past and present)

34. — ANATOMY

Cabot, P. S. de Q. The relationship between characteristics of personality and physique in adolescents. Genetic psychology monographs 20, 3-120, 1938. ISIS

An important and valuable contribution to the problem of the relationship between physique and character as first postulated by KRETSCHMER, for whose views Dr. CABOT, like so many other investigators, has failed to obtain any factual support. M. F. A.-M.

Guisande, Gumersindo Sánchez. Datos para la historia de la anatomía en España (siglos XIV al XVI). *Publicaciones de la cátedra de historia de la medicina* 1, 77-128, Buenos Aires, 1938. ISIS

Marston, Alvan T. The Swanscombe skull. *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 67, 339-406, 1937. ISIS

The author is the discoverer of a human parietal and occipital bone, and many associated animal remains and artifacts in the Barnfield Pit at Swanscombe, and this is his account of the discoveries, to which he has added an analysis of the material. The official report on his discoveries will appear in a short time. M. F. A.-M.

35. — PHYSICAL ANTHROPOLOGY

(*Anthropometry and races of man*)

Fleure, H. J. Racial evolution and archaeology (Huxley memorial lecture, 1937). *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 67, 205-29, 1937. ISIS

Numelin, Ragnar. The wandering spirit. A study of human migration. With a foreword by EDWARD WESTERMARCK. XVI + 375 p. London, MACMILLAN, 1937. ISIS

Reviewed by CHARLES A. KOFOID, *Isis* 29, 194-96, 1938.

36. — PHYSIOLOGY (*human and comparative*)

Benedict, Francis G.; Lee, Robert C. Hibernation and marmot physiology. X + 240 p., 2 pl., 11 fig. Washington, D.C., Carnegie Institution, publication no. 497, 1938. ISIS

"A metabolic survey of the marmot or woodchuck (*artomys monax*) was made to contribute information regarding the physiology of the animal itself and for comparison with other warm-blooded animals that do not hibernate and with cold-blooded animals. As the marmot may be living on one day as a normal warm-blooded animal and on another day more nearly as a cold-blooded animal, it bridges the gap, so to speak, between these two great animal classes. Forty-eight marmots, of both sexes, ranging in weight from 1 to 5 kg., were studied in the non-hibernating and hibernating states, and in the transitional stages of entering and wakening from hibernation. The measurements made included those of body weight changes, insensible perspiration, heart and respiration rates, rectal temperature, respiratory exchange, and water-vapor output. The effects of different environmental temperatures upon the various physiological functions were also studied, as well as the body composition after prolonged fasting. Observations were made on several marmots that were under nembutal

and subsequently exposed to a cold environment and upon others that were subjected to carbon-dioxide narcosis and cold. The metabolism of the marmot under nembutal was measured and compared with that of the normal marmot in deep hibernation. Analyses were made of the urines of several marmots while fasting and hibernating, including determinations of the total nitrogen and the percentages of nitrogen in the form of ammonia nitrogen, amino-acid nitrogen, urea nitrogen, and preformed creatinine. The study of the respiratory quotients was materially aided by the measurements made on marmots under the influence of nembutal. Contrary to the commonly assumed changes in metabolism due to hibernation, there was not a marked change in the character of the respiratory exchange, the respiratory quotient was not lowered, there was no evidence of a retention of oxygen, and there was no hint of perturbed oxidation of body material. The protein metabolism underwent no qualitative alteration in hibernation. These two purely chemical findings support the belief that there are no profound anatomical or functional changes associated with hibernation, and all theories involving such an assumption are, therefore, invalidated." ... " The monograph concludes with a digest of the main findings and a consideration of the possible causes of hibernation."

Cannon, W. B.; Rosenbleuth, A. Autonomic neuro-effector systems. XVI + 229 p., 42 fig. New York, MACMILLAN, 1937 ($ 4.00). ISIS

This is a critical summary of the new realm of biological research developed in the past fifteen years concerning the existence of a distinct chemical step in the transmission of impulses from nerves to their muscular and glandular agents. This is the fifth monograph in the experimental biology series. It presents a detailed account of the mediation of this newly discovered chemical step in the mammalian autonomic system, the autonomic effectors and their intimate nerve supply, surveys the history of the physiological concept of chemical mediation and the physiological and pharmacological evidences upon which this concept was built up. The earlier known electrical phenomena of the effectors of the autonomic system, mainly smooth muscle cells, are reviewed in the light of the interposition of this chemical mediator. Possibilities of significant extensions of the concept of the chemical mediator to include the mediation between other nerve terminals and their effector cells and between adjacent neurones of the central nervous system are discussed. C. A. K.

39. — PREHISTORY

Bishop, Carl Whiting. Origin and early diffusion of the traction plow. *Annual report of the Smithsonian Institution for the year ending June* 30, 1937, p. 531-47, 4 pl., 7 fig., 1938. ISIS

Reprinted by permission from *Antiquity*, September 1936.

Leplae, Edmund. Les agriculteurs de Hesbaye vers l'an 8000 avant JÉSUS-CHRIST. *Revue des questions scientifiques* 114, 15-28, 7 fig., 20 juillet 1938. ISIS

Lippmann, Edmund O. von. Ueber vorgeschichtliche Zuckerfunde. *Die deutsche Zuckerindustrie* Nr. 19, 511-12, 1938. ISIS

40. — ETHNOLOGY

(*Primitive and popular science*)

Frazer, James George. Aftermath, a supplement to *The golden bough*. XXI + 494 p. New York, MACMILLAN, 1937. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 29, 191-2, 1938.

Pelseneer, Jean. Le primitif et le savant. *Isis* 29, 95-7, 1938. ISIS

Saintyves, P. (ÉMILE NOURRY, 1870-1935) Manuel de folklore. Lettre-préface de S. CHARLÉTY. VII + 218 p., frontispiece. Paris, NOURRY, 1936. (30 fr.). ISIS

Manuel fort bien fait, admirablement édité par la veuve de l'auteur, Mme NOURRY-SAINTYVES. L'œuvre est restée malheureusement incomplète. Le dernier chapitre sur la méthode chronographique est resté à l'état d'ébauche, et du tome II il n'y a hélas ! que le plan. C'est bien fâcheux que cet homme érudit, bon et sage, qui avait consacré sa vie au folklore n'ait pu mener à bout cette œuvre magistrale. Quoiqu'il en soit, la partie que nous devons à la piété conjugale est fort précieuse. Elle contient beaucoup de détails intéressants concernant l'histoire de l'ethnographie et du folklore. G. S.

Saintyves, P. (ÉMILE NOURRY, 1870-1935). Un grand folkloriste. 70 p., port. Paris, LAROSE, 1935 (fr. 10). ISIS

Précieuse plaquette consacrée à la mémoire du grand folkloriste. Il contient un beau portrait, des discours de RENÉ MAUNIER, RAOUL ANTHONY, LOUIS MARIN, Sir JAMES GEORGE FRAZER, des notes biographiques de Mlle C. LEROY, une bibliographie complète et un article inédit du cher disparu sur le folklore, sa définition et sa place dans les sciences anthropologiques. G. S.

Tricot-Royer, Dr. Le folklore médical belge. *Petrus Nonius* 1, 357-79, 1938. ISIS

Wehrli, G. A. Das Wesen der Volksmedizin und die Notwendigkeit einer geschichtlichen Betrachtungsweise derselben. *Essays presented to* KARL SUDHOFF, p. 369-88, Zurich, 1924. ISIS

43. — SOCIOLOGY, JURISPRUDENCE AND POSITIVE POLITY

Arnold, Thurman W. The folklore of capitalism. 400 p. New Haven, Yale University Press, 1937. ISIS

Views our current legal and economic theory as the incantations of a

ceremonial priesthood. Holds that these ritualistic doctrines relieve tensions and provide emotional expressions, but do not guide our social organization.
R. K. M.

LaPiere, Richard T. Collective behavior. XIII + 577 p. New York, McGRAW-HILL, 1938 ($ 4.00). ISIS

A text-book on collective behavior which is tentatively defined as " the interaction which occurs between two or more socialized human beings for the duration of the particular situation in which that interaction occurs." The restriction of the duration of the situation distinguishes this branch of social psychology from the study of sociology. The book is extremely interestingly written and very fully documented. The appendices which follow each chapter contain the raw materials which are formally organized and clearly presented to the student in the preceding chapter. M.F.A.-M.

Mumford, Lewis. The culture of cities. XII + 586 p., 32 ills. New York, HARCOURT, BRACE, 1938 ($ 5.00). ISIS

A detailed study tracing the evolution of the city from the medieval to the modern period. The degeneration of urban ecological patterns is attributed to lack of planning and a complex of processes deriving from interest in maximizing profits. A plan for eliminating the self-defeating congestion of the modern city is carefully outlined. R. K. M.

Stonequist, Everett V. The marginal man : a study in personality and culture conflict. XVIII + 228 p. New York, SCRIBNER'S, 1937 ($ 1.60). ISIS

An analytical study of the conflicts experienced by persons who " live in two cultures," which provides a useful guide to understanding the problems of intellectuals and scientists in exile from their totalitarian homeland. It also sheds light on the conflict of loyalties experienced by those scientists who have remained, despite a régime of *Gleichschaltung*.
R. K. M.

Whitehead, T. N. The industrial worker : a statistical study of human relations in a group of manual workers. 2 vols. XIV + 265 p., ill., fig. Cambridge, Harvard University Press, 1938 ($ 5.00). ISIS

This exemplary study deserves mention in *Isis* as possibly marking a new departure in present-day social science. It is a meticulous attempt to apply the experimental method in the field of human relations, and as such constitutes the initial realization of what earlier social thinkers, from COMTE to PARETO, had held out as a distant objective. The ordering of the observational materials and the prudent, yet highly suggestive, interpretation of these data may well stand as a methodological model for other investigators of human behavior. This study is recommended to those who have hitherto despaired of the emergence of sociology from the ' metaphysical ' to the ' positive stage.' R. K. M.

44. — HISTORY OF CIVILIZATION

(General history, Historical methods, Biography and chronology)

Domanovszky, Alexandre. La méthode historique de M. NICOLAS IORGA. (A propos d'un compte rendu). 323 p. Imprimerie de l'Université royale hongroise (s.a.). ISIS

Murray, Gilbert. Liberality and civilization. 94 p. New York, MACMILLAN, 1938 ($ 1.00). ISIS

In these two Hibbert lectures, delivered before the Universities of Bristol, Glasgow, and Birmingham, GILBERT MURRAY makes a strong plea for the revival of the spirit of liberality as distinct from the political philosophy of liberalism. Every word is tinged with a deep humanity, and the lectures make inspiring reading. To deny the spirit of liberality is to deny humanity, and any political system which neglects to face that fact must ultimately perish. Sir GILBERT MURRAY's prescriptions for bringing that spirit of liberality within the realm of human practice may not impress all readers alike, but howsoever they may think in that respect they cannot fail to admire the spirit of their proponent and to agree with his aims.

M. F. A.-M.

46.—HISTORY OF LANGUAGE, WRITING AND LITERATURE

Callewaert, H. Physiologie de l'écriture cursive, avec 56 figures groupant des croquis de U. WERNAERS, des photogravures extraites de films, des reproductions d'écritures, etc. 122 p. Paris, DE BROUWER, (received Sept. 1938). ISIS

Chadwick, H. Munro; Chadwick, N. Kershaw. The growth of literature. Vol. I : The ancient literature of Europe. XX + 672 p. Vol. II, XX + 783 p. Cambridge, University Press, 1936. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 29, 196-97, 1938.

Panconcelli-Calzia, G. Phonetik und Kultur. Mit 19 Abbildungen auf Kunstdruck darunter eine farbige Abbildung und eine Original-Federzeichnung von ROBERT HÖGFELDT. 78 p., 12 pl. Hamburg, Hansischer Gildenverlag, 1938. ISIS

Inhalt : Vorwort; Sprechen und Singen in der bildenden Kunst; Zur Geschichte der Stimmgabel und ihrer Verwendung in der Experimentalphonetik; Die Phonetik im Spiegel von Marinos " Adone "; Über Entstehung und Entwicklung der Sprechschreibmaschine.

Pease, Arthur Stanley. Book and style. *Italica* 15, 129-31, 1938. ISIS

Postl, H. Le parchemin et ses imitations. *Chimie et industrie* 11, 959, 1924. ISIS

Les documents importants sont encore imprimés ou écrits sur parchemin. Le prix élevé du véritable parchemin (peaux de vaches, moutons, porcs, ânes) a incité les chercheurs à le remplacer par un produit végétal. Mais il y a de grandes différences entre ces deux produits. Le vrai parchemin se roule en brûlant, donne une odeur caractéristique de cheveu brûlé; le papier parchemin brûle aisément sans se rouler. L. L.

VII. — MEDICINE

50. — HISTORY, ORGANIZATION, AND PHILOSOPHY OF MEDICINE

Alvarez, Walter C. The emergence of modern medicine from ancient folkways. *Annual report of the Smithsonian Institution for the year ending June* 30, 1937, p. 409-30, 1 pl., 3 fig., 1938. ISIS

Read at the open meeting of the Minnesota chapter, Jan. 24, 1936. Reprinted by permission, with some alterations by the author, from the *Sigma Xi quarterly*, vol. 24, September 1936.

Beltran, Juan Ramón. Introducción al estudio de la historia de la medicina. *Publicaciones de la cátedra de historia de la medicina* 1, 11-34, Buenos Aires, 1938. ISIS

Buchanan, Scott. The doctrine of signatures. XIV + 205 p. New York, HARCOURT, BRACE, 1938 ($ 2.75). ISIS

It is the author's view that medicine may eventually turn out to be " the philosophy of science that is now being piously and futilely sought for in a thousand universities," and in this book the author sets out " to persuade both philosophers and medical men that there are solid matters of great interest and importance for their consideration." Unfortunately the author's equipment is quite inadequate for the task he has set himself, and the result is a highly metaphysical medievalism of thought whose sources are clearly to be looked for in the ascientific bias of the neo-Thomists. M. F. A.-M.

Carrea, Juan U. Los primeros odontólogos diplomados en la Argentina. *Publicaciones de la cátedra de historia de la medicina* 1, 155-80, 19 fig., Buenos Aires, 1938. ISIS

Corner, George W., 4th. Medicine in the modern drama. *Annals of medical history* 10, 309-17, 2 fig., 1938. ISIS

Deutsch, Albert. The mentally ill in America. A history of their care and treatment from colonial times. With an introduction by WILLIAM A. WHITE. XVII + 530 p., 8 ills. New York, DOUBLEDAY, DORAN, 1937. ISIS

Reviewed by C. MACFIE CAMPBELL, *Isis* 29, 197-200, 1938.

Dorland, W. A. Newman. The American illustrated medical dictionary. 1607 p. Philadelphia, SAUNDERS, 1938 ($ 7.50). ISIS

The eighteenth edition, thoroughly revised and augmented, of the acknowledgedly best dictionary of the terms used in medicine, surgery, dentistry, pharmacy, chemistry, nursing, veterinary science, biology, medical biography, etc. There are some 942 illustrations, including 283 portraits. M. F. A.-M.

Drinker, Cecil K. Not so long ago : a chronicle of medicine and doctors in colonial Philadelphia. XII + 183 p. New York, Oxford Univ. Press, 1937. ISIS

Reviewed by HENRY R. VIETS, *American historical review* 44, 216, 1938.

Fiorini, José María. Algunos aportes para la historia de la odontología en la Argentina. Fundación de la Escuela de odontología de Buenos Aires.—Biografía del Dr. NICASIO ETCHEPAREBORDA. *Publicaciones de la cátedra de historia de la medicina* 1, 219-36, Buenos Aires, 1938. ISIS

Freeman, Joseph T. The history of geriatrics. *Annals of medical history* 10, 324-35, 3 fig., 1938. ISIS

Hume, Edgar Erskine. Medical work of the Knights Hospitallers of Saint John of Jerusalem. Second period (1523-1798). The occupation of Malta. *Bulletin of the Institute of the history of medicine* 6, 399-466, 29 fig.; 495-613, 46 fig.; 677-819, fig. 76-123, 1938. ISIS

Mettler, Cecilia C. History of Georgia school of medicine. *Phi Chi quarterly* 17-24, Jan. 1937. ISIS

Mettler, Cecilia C. Two Augusta fee bills. A bit of medical history. *Georgia historical quarterly* 21, 7 p., 1937. ISIS

Milch, Werner. Über die Stelle der Medicohistorie im System der Wissenschaften. *Janus* 42, 142-64, 1938. ISIS

Rooseboom, Maria. De geneeskundige afdeeling van het nederlandsch historisch natuurwetenschappelijk museum te Leiden. *Bijdragen tot de geschiedenis der geneeskunde* 18, 168-72, 3 fig., 1938. ISIS

Rosen, George. Negative factors in medical history. A preliminary inquiry into their significance for the dynamics of medical progress. *Bulletin of the Institute of the history of medicine* 6, 1015-19, 1938. ISIS

Shuman, John W. Southern California medicine. *Annals of medical history* 10, 215-36, 8 fig.; 336-55, 1 fig., 1938. ISIS

Sigerist, Henry E. American medicine. Translated by HILDEGARD WAGEL. IX + 316 p., 30 ills. New York, NORTON, 1934. ISIS

Reviewed by JOHN B. DE C. M. SAUNDERS, *Isis* 29, 200-03, 1938.

Sigerist, Henry E. The development of medicine and its trends in the United States, 1636-1936. *New England journal of medicine* 218, 325-28, 1938. ISIS

Sigerist, Henry E. Die Geburt der abendländischen Medizin. *Essays presented to* KARL SUDHOFF, p. 185-205, Zurich, 1924. ISIS

Sigerist, Henry E. Report of the activities of the Institute of the history of medicine of the Johns Hopkins University during the academic year 1937-1938. *Bulletin of the Institute of the history of medicine* 6, 858-88, 8 fig., 1938. ISIS

Sigerist, Henry E. Socialized medicine in the Soviet Union. 378 p., 26 ills. New York, NORTON, 1937. ISIS

Reviewed by JOHN B. DE C. M. SAUNDERS, *Isis* 29, 200-03, 1938.

Snoeck, Jean. L'évolution et l'avenir de l'obstétrique. *Rev. de l'Univ. de Bruxelles* 43, 266-80, 1937-38. ISIS

Sudhoff, Karl (1853-1938). Essays on the history of medicine presented to KARL SUDHOFF on the occasion of his seventieth birthday, November 26, 1923, by Sir T. CLIFFORD ALLBUTT, ARTURO CASTIGLIONI, FRIEDRICH DANNEMANN, PAUL DIEPGEN, ERICH EBSTEIN, FIELDING H. GARRISON, ERNST HOWALD, ARNOLD C. KLEBS, E. O. VON LIPPMANN, MAX NEUBURGER, SIR HUMPHRY ROLLESTON, HENRY E. SIGERIST, CHARLES AND DOROTHEA SINGER, W. G. SPENCER, GEORG

STICKER, E. C. STREETER, LYNN THORNDIKE, G. A. WEHRLI, and EDWARD THEODORE WITHINGTON. Edited by CHARLES SINGER and HENRY E. SIGERIST. 418 p., 35 ills. Zürich, SELDWYLA, 1924. ISIS

This work, not received at the time of its publication, is analyzed in C. B. 56. A few articles however were previously recorded because the authors had sent me reprints of them. The book includes a bibliography of SUDHOFF's writings by H. E. SIGERIST, a portrait, and a preface by Sir T. CLIFFORD ALLBUTT. G. S.

Ünver, A. Süheyl. Tib tarihi (Tarihten evvelki zamandan Islâm tababetine kadar). 101 p., 52 fig. (Istanbul Üniversitesi Yayinlarindan, Adet, 64). Matbaai Ebüzziya, Istanbul, 1938 (in Turkisch). ISIS

Ancient history of medicine in Turkish with many illustrations. G. S.

Weinberger, Bernhard Wolf. Early dental literature. *Bulletin of the medical library association* 26, 222-47, 1938. ISIS

Valuable bibliographical study of the early publications on dentistry in many countries. The earliest of all being the *Artzney Büchlein* or *Zene Artznei*, of which 14 editions are listed from 1530 to 1576. G. S.

White, William. A survey of the social implications of the history of medicine in Great Britain, 1742-1867. *Annals of medical history* 10, 279-300, 1938. ISIS

51. — EPIDEMIOLOGY. HISTORY OF SPECIAL DISEASES

(*Public health and social medicine*)

Burke, Richard M. A historical chronology of tuberculosis. 84 p. Springfield, Ill., THOMAS, 1938 ($ 1.50). ISIS

There is much to be said for the chronological treatment of progress in any technical field. The popularity of historical chronologies of medicine testifies to the appeal of this method for reference workers who frequently desire succinct statements with dates for important events. Dr. BURKE has supplied an admirable historical chronology for tuberculosis. Each section (Ancient period, 5000 B. C.-1600 A. D.; Pre-modern period, 1600-1800; and modern period, 1800-) is opened by a brief narrative summary following which the actual dates and contributions are listed. While an accurate clinical description of phthisis was given in the Hippocratic school (400 B. C.) it was not until 1679 that SYLVIUS associated tubercles in the lung with the disease. BREHMER's modern institutional treatment (1859) antedated VILLEMIN's experimental demonstration that the disease is a specific infection (1865). In 1882 KOCH discovered the tubercle bacillus, and effective methods of prevention were undertaken.

The volume includes a graphic outline of the development of our knowledge of tuberculosis with respect to general information, diagnosis and treatment, and prevention. There is a short but useful bibliography and full index. Dr. BURKE's chronology is an admirable solution for information concerning the evolution of knowledge of one of the most important diseases.

C. D. L.

Friedman, Reuben. The paleontology of the Acarus scabiei. *Medical life* 45, 188-90, 1938. ISIS

Garrison, Fielding H. The newer epidemiology. *Essays presented to* KARL SUDHOFF, p. 255-68, Zurich, 1924. ISIS

Iff, Wilhelm. Zum 70. Geburtstag von Professor Dr. F. DE QUERVAIN, Bern, 4. Mai, 1938. Die Entwicklung der Kropfbehandlung. *Janus* 42, 69-88, 1938. ISIS

Ünver, A. Süheyl. Quelques mots sur l'ancienneté de la malaria en orient. *Türk tib tarihi arkivi* 2, no. 6, 3-4, 1938. ISIS

52. — HISTORY OF HOSPITALS, MEDICAL TEACHING, AND OF THE MEDICAL PROFESSION. BALNEOLOGY. MEDICAL GEOGRAPHY

Bechet, Paul E. L'hôpital Saint-Louis. A brief biographical sketch of its early teachers, and their influence upon American dermatology. *Annals of medical history* 10, 405-12, 5 fig., 1938. ISIS

Moreno, Anibal Ruiz. Organización colonial del hospital de mujeres. *Publicaciones de la cátedra de historia de la medicina* 1, 237-51, Buenos Aires, 1938. ISIS

Pastorini, Raul. Apuntes para la historia de la cátedra de ginecología de la Facultad de ciencias médicas de Buenos Aires. *Publicaciones de la cátedra de historia de la medicina* 1, 279-94, Buenos Aires, 1938. ISIS

53. — PHARMACY. PHARMACOLOGY. TOXICOLOGY

Cook, E. Fullerton. National and international standards for medicines. *Annual report of the Smithsonian Institution for the year ending June* 30, 1937, p. 431-50, 1938. ISIS

Häfliger, J. A. Das Apothekenwesen Basels. 146 p., 4 pl., 7 fig. Berlin, Gesellschaft für Geschichte der Pharmazie, 1938. ISIS

Miranda, Juan Miguel Márquez. Historia de la anestesia. *Publicaciones de la cátedra de historia de la medicina* 1, 181-98, Buenos Aires, 1938. ISIS

Robinson, William. The healing properties of allantoin and urea discovered through the use of maggots in human wounds. *Annual report of the Smithsonian Institution for the year ending June* 30, 1937, p. 451-61, 1938. ISIS

VIII. — EDUCATION

(*The methods of accumulating, imparting and diffusing knowledge*)

55. — ACADEMIES, SOCIETIES, CONGRESSES. NATIONAL AND INTERNATIONAL ORGANIZATION OF SCIENCE

(*Societies and congresses devoted to particular sciences are classified under those sciences. For the internal organization of science—Isis* I, 195—*see section* 17 *above*)

Beltran, Juan Ramon. Síntesis histórica de la Academia nacional de medicina de Buenos Aires. *Publicaciones de la cátedra de historia de la medicina* 1, 35-76, Buenos Aires, 1938. ISIS

Kennelly, A. E. Text of the charter of the *Académie royale de Belgique*. Translated from the original in the archives of the *Académie* at Brussels. *Proceedings of the American academy of arts and sciences* 58, 349-51, 1923. ISIS

Sigerist, Henry E. Why academies were founded. *Transactions of the College of physicians of Philadelphia* 4, 83-8, 1937. ISIS

56. — BIBLIOGRAPHY (*Methods and libraries*)

Frederking, H. Conservation des archives. *Chimie et industrie* 26, 148, 1931. ISIS

Seul le papier de chiffon exempt de charges minérales résiste pendant des siècles à la décomposition.

Les documents abîmés sont réparés soit par imprégnation avec des solutions de gélatine pure, de composés cellulosiques ou de résines; soit par recouvrage avec du papier de soie japonais ou des pergamines; le collage des papiers transparents sur le document à conserver est effectué à l'aide de colles animales de préférence, ou d'amidon. L. L.

Parsons, Henry S. A check list of foreign newspapers in the Library of Congress. VI + 209 p. Washington, D.C., Government printing office, 1929. ISIS

58. — CATALOGUES OF SECOND-HAND BOOKS ON THE HISTORY AND PHILOSOPHY OF SCIENCE

Many catalogues of second-hand books are so interesting and so full of valuable information that we shall henceforth register them in this section, together with other lists of a similar nature, such as catalogues of scientific medals and prints. When applying to the publishers of these catalogues for a copy, please mention *Isis*.

(Argosy Book stores). Further offerings from the medical library of ALLEN SALTER, M. D., of Ill. With some additions. Catalog 130, 71. New York City, 114 E. 59th St. (received Oct. 1938). ISIS

Brill, E. J. Catalogue no. 101. Oriental literature of the large library of the late GABRIEL FERRAND, editor of the *Journal asiatique*. 130 p., 1519 items. Leiden, 1938. ISIS

Davis & Orioli. 200 rare books including a magnificent manuscript book of hours, the first printed book on arithmetic, the first editions of ARISTOTLE's works and the Aphorisms of HIPPOCRATES, the first modern work on Architecture by ALBERTI, a dated 1469 book, two books printed by JENSON in Roman type, rare Florentine woodcut books, an uncut copy of REDOUTÉ, Les Roses, and a series of autograph letters by VOLTA. Cat. 83, 39 p., 200 items. London, W.C. 1, 37 Museum St. (received Oct. 1938). ISIS

Gardner, Malcolm. Catalogue of interesting items on horology and kindred subjects. No. 4, 54 p., 1732 items, 7 pl. London, W.C. 2, 3 Earnshaw St., New Oxford St., 1938. ISIS

Goldschmidt, E. P. English science & medicine. List 29, 52 p., 231 items. London, W. 1, 45 Old Bond St. (received Oct. 1938). ISIS

Goldschmidt, E. P. Mediaeval literature, education, universities. List 30, 52 p., 314 items. London, W. 1, 45 Old Bond St. (received Nov. 1938). ISIS

Goldschmidt, E. P. Science & medicine. List 31, 35 p., 276 items. London, W. 1, 45 Old St. (received Dec. 1938). ISIS

Heffer, W. A catalogue of books on travel and exploration including several collections privately purchased. No. 535, 96 p., 1757 items. Cambridge, Engl. 3-4 Petty Cury (received Oct. 1938). ISIS

(Hoosier bookshop). Americana, medicine, miscellaneous books and pamphlets, selected from stock and moderately priced. List 64, 229 items. Indianapolis, Indiana, 2135 North Alabama (received Oct. 1938). ISIS

(Hoosier Bookshop). Americana medica. List 65, 158 items. Indianapolis, Ind. 2135 North Alabama (received Oct. 1938). ISIS

(Hoosier Bookshop). Histories of medicine with medical biographies including all the early American collected works : THACHER, WILLIAMS, GROSS, ATKINSON; STONE and KELLY. Also a few histories of American hospitals being selections from stock. List 67. 259 items. Indianapolis, Ind., 2135 North Alabama (received Dec. 1938). ISIS

(Hoosier Bookshop). Miscellaneous book list. Americana, with science and medicine, and miscellaneous. No. 66, 191 items. Indianapolis, Ind., 2135 North Alabama (received Nov. 1938). ISIS

Lier, R. New acquisitions : I. Old medicine, incl. botany. II. Early science incl. astronomy, chemistry, electricity, mathematics, physics, optics, etc. 197 items. Galluzzo (Firenze), Via S. Felice a Ema, 33, 1938. ISIS

Lier, R. Old science and medicine. Bulletin 22, 40 p., 351 items. Galluzzo-Firenze, Via S. Felice a Ema, 33, Dec. 1938. ISIS

Rosenthal, A. Catalogue 1, Secular thought in the Middle Ages and the Renaissance. 57 p., 100 items, London, W. 1, 14 Curzon St., 1939 (rec'd Nov. 1938). ISIS

Thin, James. Catalogue of books and journals in mathematics, astronomy, meteorology, and physics. No. 273, 42 p., 1261 items. Edinburgh, 54, 55, 56 South Bridge, 1938. ISIS

59. — MEMORIA TECHNICA

Critical bibliography no. 56. *Isis*, vol. 30, 314-420, 1939. ISIS

This note is published at the end of our bibliography solely for the

convenience of the scholars who cut out the whole or part of it, attach extracts to catalogue cards and classify them. By adding this note to the others they will be able to find out rapidly whether this particular bibliography has been analyzed or not.

Isis no. 78 (vol. 29, 1). Bruges, 1938. ISIS

This no. is analyzed in the 55th Critical Bibliography. Every previous number has been analyzed in previous bibliographies.

60. — ERRATA

Si quis Argi oculos habere posset eosque omnes diligentissime ac accuratissime intenderet in singulos versus, multa tamen eum inter corrigendum effugerent. JOANNES MATTHAEUS (Wittenberg, 1619).

Isis

Vol. 16, p. 235, l. 8 from bottom. Read 8 m. 12 sec. (not 13 sec.), see facsimile p. 653.

Vol. 20, p. 456, l. 10. Died in 1164-5, not 1264.

Vol. 21, p. 623, in index. Take the first c out of BACKCHEIOS, BACKER, BACKER.

Osiris

Vol. 4, 374, l. 11, and p. 627. For KELLER, read KNELLER.

A few other misprints are not mentioned in these errata because they are too obvious to cause any error or confusion. I wish to express my thankfulness to the readers who take the trouble to make the above-mentioned corrections in their set of *Isis*, *Osiris*, and the *Introduction*. I would advise them, after having accomplished that little task, to write their initials near mine at the bottom of this note to indicate that these and the previous errata have been taken into account. G. S.

These and the previous errata have been corrected by.....

Index of Authors Included in the Fifty-sixth Bibliography

The Roman figures followed by (1) or (2) refer to the centurial classification (Part 1); thus Bîrûnî, XI (1) means that a work by Bîrûnî is listed under eleventh century, first half.

The Arabic figures refer to the historical and to the systematic classification (Parts II and III) which are subdivided in sections numbered consecutively from 1 to 60. For instance, Brunschvig, R., 14 indicates that a paper by Brunschvig is listed in section 14 (Islam); Blochet, E., 29 indicates that a paper by Blochet is listed in section 29 (Zoology).

December 1938. FRANCES SIEGEL.

A

Adnan, Abd-ul-Hak, 14.
Agostini, A., III(1)B.C.
Allen, P. S., XVI(1)E.
Allendy, R., XVI(1)D.
Alonso, A., XVIII(2)E.
Alvarez, W. C., 50.
Ameisenowa, Z., 6.
Andrae, T., VII(1).
Arcieri, G. P., VI B.C.
(Argosy bookstores), 58.
(Aristotle), IV(2)B.C.
Armstrong, A., 16.
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